

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 021		3.EFFECTIVE DATE 11/19/2012	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 10/18/2012 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
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<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
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Cost To GSA:	b(4)		
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15B. CONTRACTOR/OFFEROR b(6) _____ (Signature of person authorized to sign)	15C. DATE SIGNED 11/20/2012	16B. UNITED STATES OF AMERICA Anthony W Pellegrino _____ (Signature of person authorized to sign)	16C. DATE SIGNED 11/20/2012
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

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NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		

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<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
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Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> FAR 43.103(a)(3) Bilateral				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:11/19/2012		Proposal Dated:11/19/2012		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification deobligates excess funds from Option Period (Option Year 1) of the Contract, Item 0002. The amount obligated to and available for payment of all contract requirements performed and accepted during Option Period 1 is reduced as set forth above (see, Item 0002). Funds in the amount of \$121,252.15 remain obligated to and available for payment of any changes to the total cost of performance for Option Period 1 (Item 0002) resulting from application of Final Indirect Cost Rates. See the attached continuation page for details of the final estimated cost and funding for Option				

Period 1. FOR INQUIRIES REGARDING PAYMENT CONTACT: GSA Finance Customer Support 816-926-7287			
PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
Cost To GSA:	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR b(6)  (Signature of person authorized to sign)	15C. DATE SIGNED 11/20/2012	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 11/20/2012
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 021		3.EFFECTIVE DATE 11/19/2012	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 10/18/2012 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> FAR 43.103(a)(3) Bilateral				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:11/19/2012		Proposal Dated:11/19/2012		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification deobligates excess funds from Option Period (Option Year 1) of the Contract, Item 0002. The amount obligated to and available for payment of all contract requirements performed and accepted during Option Period 1 is reduced as set forth above (see, Item 0002). Funds in the amount of \$121,252.15 remain obligated to and available for payment of any changes to the total cost of performance for Option Period 1 (Item 0002) resulting from application of Final Indirect Cost Rates. See the attached continuation page for details of the final estimated cost and funding for Option				

Period 1. FOR INQUIRIES REGARDING PAYMENT CONTACT: GSA Finance Customer Support 816-926-7287			
PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
Cost To GSA:	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR b(6)  (Signature of person authorized to sign)	15C. DATE SIGNED 11/20/2012	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 11/20/2012
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

Change Request (CR) Information		
CR #	Title	Description
CR-ESPDS-250	PDA Data Remapping Clarification for NDE	This is a map format that is currently utilized by NDE. Adding this functionality to PDA would allow PDA to better service polar data users.
CR-ESPDS-251	PDA Subscription and Search Parameter Update	The proposed updates are all supported by NDE and should be included in the PDA design to ensure there is no loss of functionality when the transition from NDE to PDA occurs.
CR-ESPDS-252	Addition of GOES-R retransmission requests	The only method to get a file from PD to PDA after the initial transmission is if PD receives a "file transfer failure notification" message from PDA. The current design is that this message is only generated via PDA in one of two cases 1) an immediate failure during transfer or 2) during reconciliation of the PD provided manifest.
CR-ESPDS-261	Consumer Groups	There is an operational need to allow subscriptions and searches to be managed by more than one user
CR-ESPDS 263	File Renaming for Data Pushes	Both the current DDS and NDE support the capability to rename files on push; a file can be pushed with prefix or a suffix that will be removed after file transfer is complete. This is used by receiving systems to detect when a file is ready for processing. This feature is utilized by multiple users and each user is allowed to configure their own rename format.

CR-ESPDS 265	PDA Protocols Cleanup	Some of the recommended protocols are supported by the current DDS/SatepsDIST systems and should be maintained in the new system due to user requirements; these are FTP and HTTP. Additionally, RSS for web feeds, and ODBC/JDBC for database access are recommended for inclusion in PDA because they make sense for a system that provides data to external sources in today's environment. Research has uncovered users that are expecting PDA to support Open Geospatial Consortium (OGC) standards for search, retrieval and discovery and users requesting the ability to search data using ISO Z3950, therefore it is recommended that the PDA design continue to support these protocols.
CR-ESPDS 270	User Data Access by Data Type Groups	There is an operational need to control consumer access to product data by product groupings.
CR-ESPDS 272	End-User management of ADRS subscriptions	The requirements being added correspond to similar PDA requirements that bound/ limit subscriptions by operator configurable parameters (see PDA256, PDA254, and PDA260) and are applicable to ancillary data subscriptions
CR-ESPDS 283	xRIT File formatting addition to PDA	This change to PDA will allow the forthcoming HRIT/EMWIN system to utilize PDA for data acquisition allowing HRIT/EMWIN design to be significantly simplified from the original LRIT design. The LRIT design consists of 6 separate processing "Domains"; adding the capability to generate LRIT and HRIT files into PDA will allow the HRIT/EMWIN system to eliminate the functionality of 2-3 of the processing domains.



[illegible]

WA(s) Affected	Cost Impact		Schedule Impact			Decision Need Date	CCB Conditional Approval Date
	Increase/ Decrease/ None	\$	Hour Impact	Anticipated Work Start	Anticipated Work End		
PDA	Increase			1/30/2013	10/24/2014	1/2/2013	3/21/2012
PDA	Increase			5/3/2012	10/24/2014	5/3/2012	3/21/2012
PDA	Increase			5/3/2012	10/24/2014	5/3/2012	5/2/2012
PDA	Increase			5/3/2012	10/24/2014	5/3/2012	5/2/2012
PDA	Increase			1/30/2013	10/24/2014	1/2/2013	5/2/2012

PDA	Increase			1/2/2013	10/24/2014	1/2/2013	5/31/2012
PDA	Increase			6/1/2012	10/24/2014	6/1/2012	5/31/2012
ADRS	N/A			6/1/2012	10/24/2014	6/1/2012	5/31/2012
PDA	Increase			1/2/2013	10/24/2014	1/2/2013	8/8/2012
	<b>TOTAL</b>						

[illegible]

Concurrence			Mod # Planned/ Actual	Notes
Gov't PMO	Solers	GSA		
YES- Agreed at CCB meeting 3/21. Additional funds from GOES-R are expected in next funding transfer	YES- Agreed at CCB meeting 3/21, provided funding is secured Solers is ready to do this work	YES- Agreed in email from Tony to Solers 5/4/2012	Planned for Mod 18	
YES- Agreed at CCB meeting 3/21. Additional funds from GOES-R are expected in next funding transfer	YES- Agreed at CCB meeting 3/21, provided funding is secured Solers is ready to do this work	YES- Agreed in email from Tony to Solers 5/4/2012	Planned for Mod 18	
YES- Agreed at CCB meeting 5/2. Additional funds from GOES-R are expected in next funding transfer	YES- Agreed at CCB meeting 5/2, provided funding is secured Solers is ready to do this work	YES- Agreed in email from Tony to Solers 5/4/2012	Planned for Mod 18	
YES- Agreed at CCB meeting 5/2. Additional funds from GOES-R are expected in next funding transfer	YES- Agreed at CCB meeting 5/2, provided funding is secured Solers is ready to do this work	YES- Agreed in email from Tony to Solers 5/4/2012	Planned for Mod 18	
YES- Agreed at CCB meeting 5/2. Additional funds from GOES-R are expected in next funding transfer	YES- Agreed at CCB meeting 5/2, provided funding is secured Solers is ready to do this work	YES- Agreed in email from Tony to Solers 5/4/2012	Planned for Mod 18	

YES- Agreed at CCB meeting 5/31/12.	YES-Agreed at CCB meeting at 5/31/12 provided funding is secured.			
YES- Agreed at CCB meeting 5/31/12.	YES-Agreed at CCB meeting at 5/31/12 provided funding is secured.			
YES- Agreed at CCB meeting 5/31/12.	YES-Agreed at CCB meeting at 5/31/12 provided funding is secured.			Dependent on CR 270; no additional cost to implement CR 272
YES- Agreed at CCB meeting 8/8/12	YES-Agreed at CCB meeting at 8/8/12 provided funding is secured.			

[illegible]

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 022		3.EFFECTIVE DATE 12/10/2012	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 11/20/2012 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> FAR 43.103(a)(1)				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:12/05/2012		Quote Dated:12/05/2012		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This is a bilateral modification resulting from a negotiated change order (Supplemental Agreement). See the attached continuation page for details. <b>FOR INQUIRIES REGARDING PAYMENT CONTACT:</b> GSA Finance Customer Support 816-926-7287				



PRIOR AMOUNT		NEW AMOUNT		INCREASE/DECREASE
<b>Cost To GSA:</b>		b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER(Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
b(6)		Anthony W Pellegrino (617) 565-5750		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED	
b(6)	12/11/2012	Anthony W Pellegrino	12/11/2012	
(Signature of person authorized to sign)		(Signature of person authorized to sign)		
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		

Modification 22 is a bilateral modification (supplemental agreement) incorporating, and making equitable adjustment for, negotiated changes to the Contract:

1. The estimated cost and price (equitable adjustment) of the Contract is increased by \$557,280.00 for those changes to Work Assignment 1 – PDA as detailed in the attached *Change Requests with Cost Impact Tracker*; and
2. The estimated cost and price (equitable adjustment) of the Contract is increased by \$10,964,400.00 for the purchase of Direct Materials required to complete the changes to the requirements of Work Assignment 1 – PDA. The anticipated direct materials are set forth in the attached *WAI – PDA ADRS Direct Materials Estimate*. The Government, through the Contracting Officer, shall place all orders for Direct Materials.

This Modification makes complete equitable adjustment for the changes ordered and negotiated; however, the equitable adjustment is based upon the estimated cost of performance. The fee to be earned by the Contractor and associated with the equitable adjustment is subject to the Award Fee Plan.

Modification 21 obligates funds to Option Year 2 of the contract as detailed in the attached *Funding Allocation* document. This is an incrementally funded contract for services. The price of Direct Materials may not be incrementally funded. The Contractor shall continue working with the Contracting Officer's Representative and the Contracting Officer to ensure the adequate funds are obligated for the purchase of any Direct Materials.

Modification 22 is a bilateral modification (supplemental agreement) incorporating, and making equitable adjustment for, negotiated changes to the Contract:

1. The estimated cost and price (equitable adjustment) of the Contract is increased by b(4) for those changes to Work Assignment 1 – PDA as detailed in the attached *Change Requests with Cost Impact Tracker*; and
2. The estimated cost and price (equitable adjustment) of the Contract is increased by b(4) for the purchase of Direct Materials required to complete the changes to the requirements of Work Assignment 1 – PDA. The anticipated direct materials are set forth in the attached *WAI – PDA ADRS Direct Materials Estimate*. The Government, through the Contracting Officer, shall place all orders for Direct Materials.

This Modification makes complete equitable adjustment for the changes ordered and negotiated; however, the equitable adjustment is based upon the estimated cost of performance. The fee to be earned by the Contractor and associated with the equitable adjustment is subject to the Award Fee Plan.

Modification 21 obligates funds to Option Year 2 of the contract as detailed in the attached *Funding Allocation* document. This is an incrementally funded contract for services. The price of Direct Materials may not be incrementally funded. The Contractor shall continue working with the Contracting Officer's Representative and the Contracting Officer to ensure the adequate funds are obligated for the purchase of any Direct Materials.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. CONTRACT ID CODE	PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 023	3.EFFECTIVE DATE 01/04/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750	
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.	
		9B. DATED (SEE ITEM 11)	
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: B. Administrative Change (No Funding or POP Date Changes)	
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 12/11/2012 12:00 AM
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>			
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.			
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:			
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.			
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...			
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>			
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.			
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).			
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:			
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 43.103(a)(3) - Agreement Modifying Contract Terms</b>			
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.			
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)			
ORDER MOD DATED:01/04/2013	Proposal Dated:01/04/2013	Order ID: R1BK13090030	
PERFORMANCE PERIOD FROM: 08/05/2010	PERFORMANCE PERIOD TO: 01/31/2014	Desired Delivery Date:	
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>
b(4)			

This is a bilateral modification modifying the labor categories and rates for Work Assignment 7, Critical Infrastructure Protection (CIP). The labor

categories and rates as set forth on the attached continuation page are effective December 19, 2012. There is no change in the value to Work Assignment 7, the amount obligated to Work Assignment 7 or this contract, and no change in the performance period. See the attached continuation page.

**FOR INQUIRIES REGARDING PAYMENT CONTACT:**

GSA Finance Customer Support 816-926-7287

PRIOR AMOUNT		NEW AMOUNT		INCREASE/DECREASE
<b>Cost To GSA:</b>	b(4)			
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750		
15B. CONTRACTOR/OFFEROR b(6)  (Signature of person authorized to sign)	15C. DATE SIGNED 01/04/2013	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 01/07/2013	
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 024		3.EFFECTIVE DATE 01/08/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 01/07/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 42.103(a) Supplemental Agreement (Changes Clause) and FAR 52.232-22 (Funding)</b>				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:01/07/2013		Quote Dated:01/07/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification results from a Supplemental Agreement following negotiated changes to the requirements of the Contract. The Contractor agrees to perform, in accordance with its technical and cost proposals, the requirements detailed in the Work Assignment 6 (HRIT) and Work Assignment 8 (GCOM) Work Statements and related documents in consideration of reimbursement of its allowable costs and a reasonable fee as set forth in the Contractor's cost proposals for Work Assignment 6, Work Assignment 8, the Enterprise Work Assignment, and the terms and conditions of the Contract as they relate to reimbursement of allowable cost and the earning and payment of fee. Copies of the Work Assignment 6 and Work Assignment 8 Work Statements and their related documents and the Contractor's Technical and Cost Proposals shall be provided under separate cover directly following this Modification. This Modification funds Option Period 2 of the Contract as set forth on the attached Continuation Page.				

FOR INQUIRIES REGARDING PAYMENT CONTACT: GSA Finance Customer Support 816-926-7287				
		PRIOR AMOUNT	NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>		b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750		
15B. CONTRACTOR/OFFEROR b(6)	15C. DATE SIGNED 01/08/2013	16B. UNITED STATES OF AMERICA Anthony W Pellegrino	16C. DATE SIGNED 01/09/2013	
(Signature of person authorized to sign)		(Signature of person authorized to sign)		
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		



# **Environmental Satellite Processing and Distribution System (ESPDS) Development**

## **High Rate Information Transmission (HRIT) / Emergency Managers Weather Information Network (EMWIN)**

### **Operations Concept**

**Version 1.2**

**August 9, 2012**



U.S. Department of Commerce (DOC)  
National Oceanic and Atmospheric Administration (NOAA)  
National Environmental Satellite, Data, and Information Service (NESDIS)



## Change Record

DOCUMENT TITLE: HRIT/EMWIN Operations Concept			
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0.2	13 June 2011	All	Incorporated Comments
1.0	25 Apr 2012	Multiple	Updated to reflect the results of the product acquisition study and the Complement/replace study. The HRIT/EMWIN system will utilize PDA for product acquisition and will generate both HRIT/EMWIN and LRIT data streams.
1.1	13 Jul 2012	Multiple	Added section on rolling rebroadcast to match new capability added to the SRD.
1.2	9 Aug 2012	All	Reformatted

The document version number identifies whether the document is a working copy, final, revision, or update, defined as follows:

- **Draft:** A document not yet baselined. This document may be distributed for team reviews, but is still undergoing considerable changes. Use 0.1, 0.2, 0.3, etc. for unpublished documents. Use 0.1A, 0.1B, when distributing sequential updates within a short period (less than Two (2) weeks).
- **Final:** The first baseline version of the document. The final is always identified as Version 1.0.
- **Revision:** An edition with minor changes from the previous edition, defined as changes affecting less than one-third of the pages in the document. The version numbers for revisions 1.1 through 1.9, 2.1 through 2.9, and so forth. After nine revisions, any other changes to the document are considered an update. Sequential revisions should be numbered as 1.1A, 1.1B, etc.
- **Update:** An edition with major changes from the previous edition, defined as changes affecting more than one-third of the pages in the document. The version number for an update is always a whole number (Version 2.0, 3.0, 4.0, and so forth).

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# 1. SCOPE

## 1.1 Identification

This Operations Concept (OPSCON) describes the purpose and usage of the High Rate Information Transmission (HRIT) and Emergency Managers Weather Information Network (EMWIN) system to be deployed as part of the ESPDS. This system is to be developed under Electronic Satellite Processing and Distribution System (ESPDS) Work Assignment #6 and will be called HRIT/EMWIN

## 1.2 System Overview

The HRIT/EMWIN system is an evolution of two existing systems, Low Rate Information Transmission (LRIT) and the Emergency Managers Weather Information Network (EMWIN). The purpose of the EMWIN system is “to provide the emergency management community with access to a set of NWS warnings, watches, forecasts, and other products at no recurring cost<sup>1</sup>.” The purpose of the LRIT system is to provide broadcast access to GOES imagery, a re-broadcast of GOES DCS observations and other weather and environmental information to anyone with line of sight visibility of an operational GOES satellite (within 5° of elevation). For many in the Caribbean, South America and the Pacific Rim, LRIT and/or EMWIN are the only reliable sources of weather information<sup>2</sup>.

LRIT is currently broadcast at a rate of 128kbps while EMWIN is broadcast at 19.2kbps. On the GOES-R satellites, the LRIT and EMWIN broadcasts will be combined to use a single transponder and frequency; the data will be segregated by means of virtual channelization. In addition to combining the two data streams, the throughput will be increased from a total of ~148kbps to 400kbps, which requires, in compliance with Coordination Group for Meteorological Satellites (CGMS) standards, the name to be changed from LRIT to HRIT.

In order to satisfy the needs of HRIT/EMWIN, the GOES-R program has provided a dedicated relay transponder on each satellite. This transponder will accept a signal from the ground and relay it as a broadcast; the only modification to the signal made on-board is a change to the center frequency. The GOES-R program has also provided the ground antennas at both WCDAS and the RBU that are capable of uplinking the HRIT/EMWIN signal to the space segment (SS).

Each user is responsible for purchasing and maintaining their own receive system. There are several manufactures that sell LRIT and EMWIN equipment; the antennas, receivers and the processing software are available for purchase<sup>3</sup>. The HRIT/EMWIN program is responsible for providing guidance to the manufacturers about data and signal parameters but will not make or sell any user equipment. NOAA expects that many of the LRIT and EMWIN manufacturers will stay in the market and produce the HRIT/EMWIN equipment.

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<sup>1</sup> <http://www.weather.gov/emwin/>

<sup>2</sup> [http://directreadout.noaa.gov/miami11/docs/3.4\\_Seymour\\_LRIT\\_EMWIN.ppt](http://directreadout.noaa.gov/miami11/docs/3.4_Seymour_LRIT_EMWIN.ppt)

<sup>3</sup> [http://www.dartcom.co.uk/products/lrit\\_hr/rit\\_hr/rit\\_hr.pdf](http://www.dartcom.co.uk/products/lrit_hr/rit_hr/rit_hr.pdf)  
[http://www.wernerlabsinc.com/EMWIN\\_index.html](http://www.wernerlabsinc.com/EMWIN_index.html)  
<http://www.weather.gov/emwin/winven.htm>

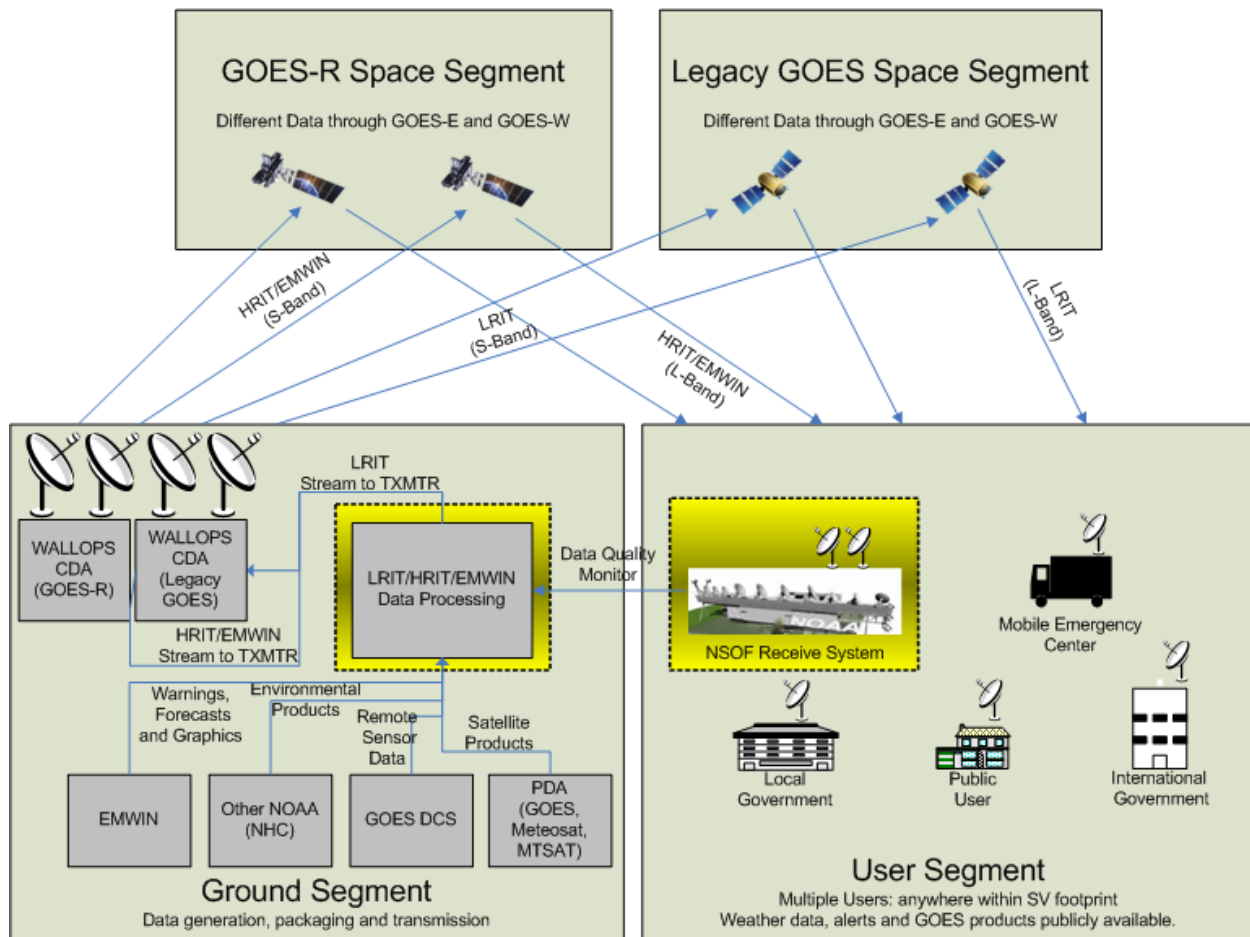
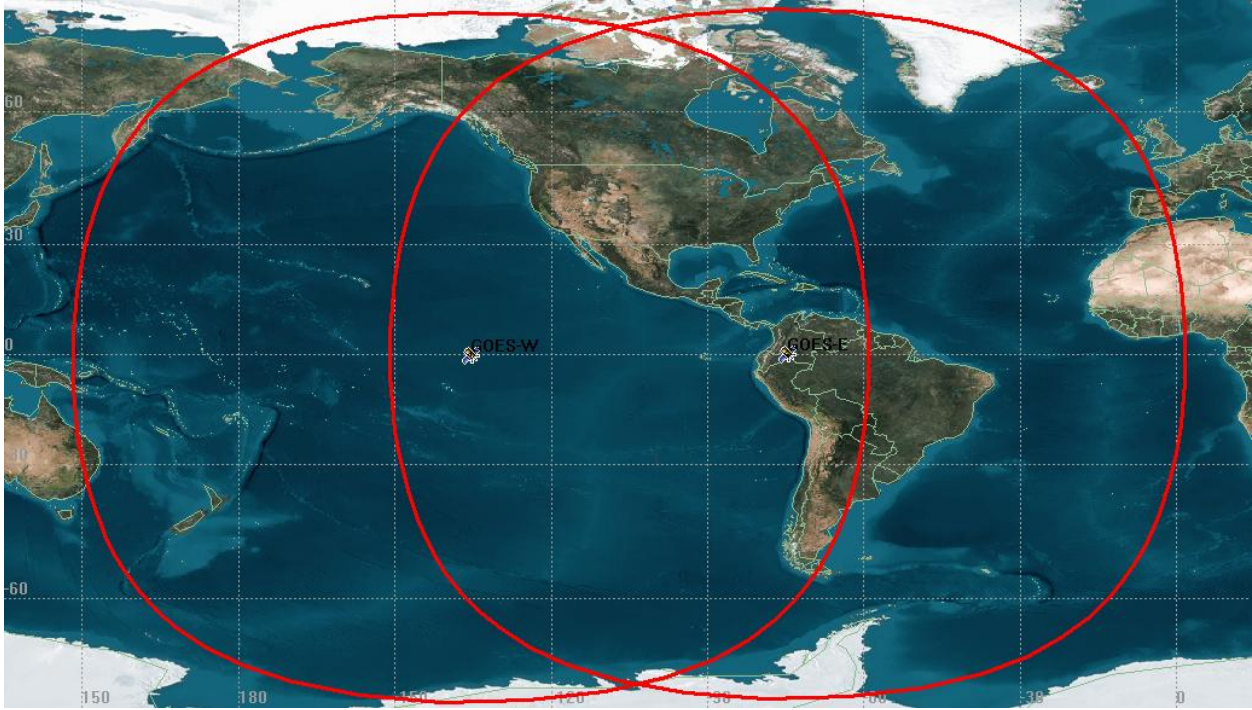


Figure 1: HRIT/EMWIN OV-1

Figure 1 shows the Operational View (DoDAF OV-1) of the entire HRIT/EMWIN program including all major interfaces. As with any satellite system there are three main components: a ground segment, a space segment and a user segment. For the purposes of this OpsCon and the development work under ESPDS WA #6, the HRIT/EMWIN system spans the ground and user segment and is indicated in the dashed boxes.

The ground segment diagram shows the HRIT/EMWIN system accepting data from multiple sources including the ESPDS Product Distribution and Access (PDA) system. After the data is packaged into appropriate files and formatted for transmission it is transferred to the antenna where the data stream is uplinked to the GOES-E and GOES-W as well as a satellite dedicated to South American operations if one is available. Each satellite modifies the center frequency and broadcasts the data to users within the broadcast footprint; Figure 2 shows the areas covered by the broadcast. Any user within the broadcast footprint that has the proper equipment can access the broadcast weather data. The HRIT/EMWIN system includes two instances of the user segment (one for GOES-E and one for GOES-W) that are used for data quality feedback into the processing system.



**Figure 2: HRIT/EMWIN Coverage Area**

### 1.2.1 Scope

The scope of the HRIT/EMWIN system described in this document includes all generation and processing required prior to sending the signal to the antenna for transmission to the SS with the exceptions being the generation of the data described in Table 1; this boundary is shown in Figure 1 with a dashed line. The system will still be responsible for processing this data into the correct format and merging it with the rest of the data stream. The new HRIT/EMWIN system will service both the LRIT broadcast as well as the future HRIT/EMWIN broadcast. Also, the telecommunications equipment and interfaces used to acquire EMWIN data from the NWS and GOES DCS data fall under the scope of the system.

**Table 1: Products not Generated within the ESPDS HRIT/EMWIN System**

Product Name	Source
<b>GOES Imagery</b>	ESPDS PDA
<b>Tropical Storm Products</b>	NOAA/NWS Hurricane Center and Tropical Storm Prediction Center
<b>EMWIN</b>	National Weather Service
<b>Data Collection System (DCS)</b>	NOAA/NESDIS/OSPO
<b>Meteosat Second Generation (MSG)</b>	ESPDS PDA
<b>MTSAT</b>	ESPDS PDA

Additionally, the HRIT/EMWIN system must incorporate a user receive segment; the purpose of this user segment will be to monitor the data stream and provide real-time feedback to the system

and helpdesk operators. Due to the life-critical aspect of the HRIT/EMWIN, (see section **Error! Reference source not found.**) an appropriate off-site backup facility also falls within the scope of the system.

### 1.3 Document Overview

The purpose of this document is to provide guidance and background information about the proposed HRIT/EMWIN system; the purpose is **not** to document a recommended design or all necessary information to create the system. This OpsCon will be provided with requests for pre-development studies; it will also be delivered along with a System Requirements Document (SRD) when the work assignment is fully awarded.

This OpsCon follows the general form and structure of DI-IPSC-81430A; since this document is generated as guidance for development and not as part of the development effort, strict DID adherence was not required or maintained.

This OpsCon contains the following sections:

Section 1: Scope - identifies the applicable software version for this plan, system overview and document overview.

Section 2: Applicable Documents – identifies documents that are referenced within this OpsCon or may be otherwise useful to the reader.

Section 3: Current Systems – describes the current state of the LRIT and EMWIN systems.

Section 4: Justification for and Nature of Changes – describes the kinds of changes that are needed and the reason those changes are required.

Section 5: Concept for New System – describes the known characteristics of the new system.

## 2. APPLICABLE DOCUMENTS

This section describes documents that are referenced in other sections of this document as well as documents that have been provided for contextual and background information.

### 2.1 Government Documents

The following government specifications and descriptions are referenced within this document.

**Table 2: Applicable Government Documents**

DOCUMENT ID	TITLE	REVISION	DATE
OSDPD/ESPC-PROD-LRIT06-002-V1.0	Earth Observing System – Low-Rate Information Transmission (LRIT) System Description Document (SDD)	1.0	May 7, 2010
G417-R-FPS-0179	Domain-5 Uplink Processor Functional & Performance Specification (F&PS)	1.0	May 8, 2009
417-R-IRD-0168	Space Segment (SS) To High Rate Information Transmission Service And Emergency Managers Weather Information Network (HRIT/EMWIN) (formerly known as EMWIN/LRIT) Interface Requirements Document (IRD)	2.3	June 16, 2009



DOCUMENT ID	TITLE	REVISION	DATE
G417-R-IRD-0095	Ground Segment (GS) to High Rate Information Transmission (HRIT) / Emergency Managers Weather Information Network (EMWIN) Interface Requirements Document (IRD)	2.1	November 23, 2009
DI-IPSC-81430A	Operational Concept Description Data Item Description	A	January 10, 2000
212-1300	NOAA IT Security Manual	4.2	March 31, 2008

## 2.2 Non-Government Documents

The following specifications are utilized to define the file format and data characteristics utilized within the HRIT/EMWIN system.

**Table 3: Applicable Non-Government Documents**

DOCUMENT ID	TITLE	REVISION	DATE	SOURCE
CGMS 03	LRIT/HRIT Global Specification	2.6	August 12, 1999	Coordination Group for Meteorological Satellites
CCSDS 732.0-B-1	CCSDS Recommendation For Space Data System Standards: AOS Space Data Link Protocol	1	September 2003	The Consultative Committee for Space Data Systems
CCSDS 131.0-B-1,	Recommendation For TM Synchronization and Channel Coding	1	September 2003	The Consultative Committee for Space Data Systems

## 2.3 Reference Documents

The following documents contain supplemental and background information that will be useful to the reader to understand more details about the current LRIT system.

**Table 4: Reference Documents**

DOCUMENT ID	TITLE	REVISION	DATE	SOURCE LOCATION
N/A	LRIT Transmitter Specification	N/A	N/A	<a href="http://noaasis.noaa.gov/LRIT/pdf-files/4_LRIT_Transmitter-specs.pdf">http://noaasis.noaa.gov/LRIT/pdf-files/4_LRIT_Transmitter-specs.pdf</a>
N/A	NOAA GOES LRIT Mission Specific Data	N/A	N/A	<a href="http://noaasis.noaa.gov/LRIT/pdf-files/5_LRIT_Mission-data.pdf">http://noaasis.noaa.gov/LRIT/pdf-files/5_LRIT_Mission-data.pdf</a>
N/A	LRIT Receiver Specification	1.1	April 8, 2003	<a href="http://noaasis.noaa.gov/LRIT/pdf-files/3_LRIT_Receiver-specs.pdf">http://noaasis.noaa.gov/LRIT/pdf-files/3_LRIT_Receiver-specs.pdf</a>
N/A	The Current Status of the GOES LRIT Service	N/A	July 21, 2010	<a href="http://noaasis.noaa.gov/LRIT/pdf-files/1_LRIT_Current_Status.pdf">http://noaasis.noaa.gov/LRIT/pdf-files/1_LRIT_Current_Status.pdf</a>



DOCUMENT ID	TITLE	REVISION	DATE	SOURCE LOCATION
N/A	Continuity of GOES Operational Satellite Programs	N/A	January 10, 2011	<a href="http://www.goes-r.gov/mission/GOES_Flyout_2011_01.pdf">http://www.goes-r.gov/mission/GOES_Flyout_2011_01.pdf</a>

### 3. Current Systems

On operational GOES satellites, LRIT and EMWIN broadcasts are transmitted via separate, dedicated on-board transponders. LRIT is currently broadcast at a rate of 128kbps while EMWIN is broadcast at 9.6 kbps on GOES I-M Series and 19.2kbps on GOES N-P Series. Since these two systems are currently separate, the background information will be presented separately. This document will only provide a high level overview of the current systems and not attempt to recreate information that exists in other locations, most notably within the LRIT System Description Document and the Transmitter/Receiver specifications.

#### 3.1 LRIT

##### 3.1.1.1 LRIT Data Contents

The LRIT broadcast is transmitted over the operational GOES-E and GOES-W satellites at a constant stream of 128Kbps. Table 5 is taken from the “The Current Status of the GOES LRIT Service” and describes the various products included in the current data stream. With the exception of the GOES imagery, the same data is broadcast through both east and west GOES satellites. The GOES imagery portion of the broadcast is specific to the satellite from which the data was generated, i.e. the LRIT broadcast from GOES-E only contains GOES products that originated from GOES-E. Note that although the EMWIN data is included in the LRIT broadcast, in the current system, this is simply a pass-through rebroadcast data as generated by the NWS.

##### 3.1.1.2 GOES DCS Data

The DCS program collects data from more than 10,000 Data Collection Platforms (DCP); these devices can be placed anywhere within the footprint of GOES-E and GOES-W. Each DCP collects, and transmits back through a GOES satellite, environmental data such as water level, wind speed, temperature and seismic information. This data can then be analyzed to monitor volcanoes, flood conditions, snow and ice conditions, tsunamis and other ocean data and even forest fires. Some of the data collected is particularly time sensitive, such as flood and tsunami data; for example a DCP may detect a leak in a dam, this data needs to be in the hands of responsible parties immediately. Currently the primary data source for GOES DCS data is a broadcast over a commercial satellite called DOMSAT (Domestic Satellite); LRIT acts as a secondary broadcast.

**Table 5: LRIT Data**

<b>Input or Product Name</b>	<b>Format</b>	<b>Source</b>
<b>GOES East</b>	Imagery: 1. Visible. 2. Infrared. 3. Water Vapor.	GOES GVAR through LRIT System
<b>GOES West</b>	Imagery: 1. Visible. 2. Infrared. 3. Water Vapor.	GOES GVAR through LRIT System
<b>Tropical Storm Products</b>	Graphic and Text	NOAA/NWS Hurricane Center
<b>EMWIN</b>	Text and Graphic	National Weather Service Telecommunications Gateway
<b>GOES DCS</b>	Text	NOAA/NESDIS/OSPO
<b>Meteosat Second Generation (MSG)</b>	Graphic	NOAA/NESDIS/OSPO
<b>MTSAT</b>	Graphic	NOAA/NESDIS/OSPO
<b>Administrative Text Message</b>	Text	LRIT System Administrators

### 3.1.2 Data Format

Each of the LRIT products is placed into an LRIT/HRIT file as specified by the Coordination Group for Meteorological Satellites (see [LRIT/HRIT Global Specification version 2.6](#)) with some implementation specific details described in the LRIT System Description Document. The GOES imagery data is segmented, based on number of scan lines, into smaller files that can be stitched back together at the user receive station. Breaking the large images into sub-areas has several advantages; the key advantage is that any temporary problem that causes a file to be damaged in transmission does not cost the user the entire image, just the affected area. Other advantages include transmission speed and product generation throughput.

After all data is placed into the appropriate LRIT file format the data is then formatted into Consultative Committee on Space Data Systems (CCSDS) Advanced Orbiting Systems (AOS) Space Data Link Protocol packets. This format is documented in “[CCSDS Recommendation For Space Data System Standards: AOS Space Data Link Protocol](#)” issue 1.

### 3.1.3 Data Generation Process

The LRIT system consists of six sequential processing domains. There are five domains prior to transmission to the Space Segment for rebroadcast and the user receive segment is called Domain 6. Figure 3 shows the overall LRIT system and how all the domains are related. This information is also captured in Table 6; note that in most system descriptions for LRIT, domains two and three are represented together and physically exist on the same hardware. Not shown in Table 6 is domain 6; the user segment contains equipment for receiving and processing the RF

signal back into the original products. For more detailed description of the data flow and formats involved see the reference documents.

The LRIT data format allows each file to be tagged with a priority level within the metadata of the header. Additionally, the system is also configured to use default priority levels for certain products. Enforcing a priority is critical to ensuring that emergency weather bulletins, such as tsunami and tornado warnings, can be broadcast as soon as possible.

**Table 6: Domain Descriptions**

Domain	Main Function	Incoming Data	Outgoing Data	Location
<b>1 Ingest</b>	Convert Level 1a GOES data (GVAR) into area files.	Level 1a GOES data	Level 1a GOES partitioned into areas.	NSOF/CIP
<b>2/3 Products Processor</b>	Convert the Level 1a GOES data into Level 1b.  Generate LRIT files containing multiple types of data.	<ul style="list-style-type: none"> <li>• GOES imagery from Domain 1</li> <li>• DCS files</li> <li>• Weather forecasts</li> <li>• Text Alerts</li> <li>• Other NOAA satellite products</li> </ul>	LRIT files	NSOF/CIP
<b>4 Communications Processor</b>	Accept EMWIN data from NWS and convert to LRIT files.  Convert LRIT files into a VCDU packet stream	<ul style="list-style-type: none"> <li>• LRIT files from Domain 3</li> <li>• EMWIN bit-stream</li> </ul>	VCDU bit stream	NSOF/CIP
<b>5 Uplink Processor</b>	Converts the VCDU packets to bit stream that is modulated and converted to IF for transmission through the ground antenna.	LRIT data in VCDU packet format.	Serial bit stream modulated in accordance with GOES antenna requirements.	WCDAS

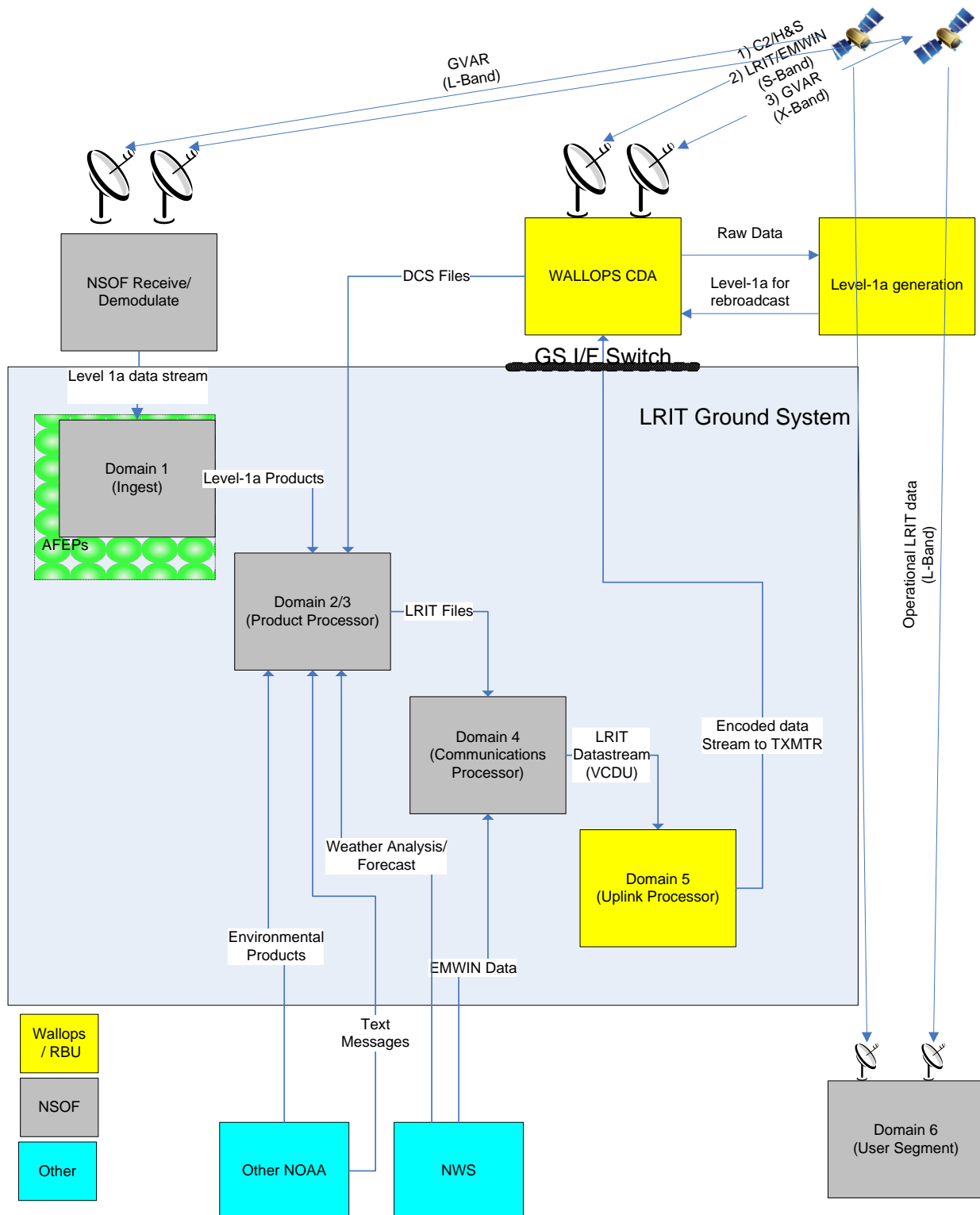


Figure 3: LRIT Notional Architecture

## **3.2 EMWIN**

EMWIN data is generated by the NWS in Silver Spring and takes two separate routes to end users. The primary transmission method of EMWIN data is a dedicated transponder on GOES I-P series spacecraft. EMWIN data is also embedded within the LRIT service as a secondary transmission method. In the context of the current LRIT system, EMWIN data is just pass-through, i.e. it is accepted by LRIT as received and added to the data stream with no modification or prioritization.

For the secondary transmission using LRIT, the EMWIN data is generated at the NWS, then it is transmitted to the NSOF and received by the current LRIT Domain 4. The Domain 4 Communications Processor takes the EMWIN data stream and encapsulates it into LRIT files. These files are then passed on to Domain 5 with all of the other LRIT files generated in Domain 2/3.

### **3.2.1 NWS to LRIT Interface**

The EMWIN data is received at NSOF over a pair of leased telecom lines. At each end of the leased lines is a Universal Data Systems V.3225 modem; these modems support the current rate of 9.6 but can also support the EMWIN-N rate of 19.2 Kbps which is their maximum throughput. The modems that are currently in use appear to be out of production.

### **3.2.2 EMWIN LRIT Files**

The EMWIN data is a continuous stream of 9.6 Kbps data that is encapsulated into LRIT files. Once all of the required LRIT format header and metadata is added, the LRIT file is incorporated into the LRIT data stream with the GOES products and other external data.

## **4. JUSTIFICATION FOR AND NATURE OF CHANGES**

The biggest driver for change to the system is the GOES-R program. The GOES-R design and Operations Concept have driven modifications to the nature of the LRIT and EMWIN programs. As previously noted the GOES-R program has combined the two systems into a single transponder and renamed the service to HRIT/EMWIN. Neither the LRIT nor EMWIN ground systems can meet the data needs and interface with the GOES-R antennas. This section provides a brief overview of the gaps generated in the current system by the GOES-R changes. There are additional required modifications that are not driven by GOES-R changes detailed in section 4.6 Non GOES-R Changes.

### **4.1 Joint Mission**

On the GOES I-M and N-P series of satellites EMWIN and LRIT each have a dedicated transponder. Although the LRIT mission rebroadcasts the EMWIN data, this is a secondary broadcast; the primary method EMWIN users receive their data is through the dedicated EMWIN signal.

Once the GOES-R series becomes operational, the primary method of attaining EMWIN data will be the joint HRIT/EMWIN signal. This means that the EMWIN data will need to be more fully integrated into the data stream. Instead of simply encapsulating all of the EMWIN data as HRIT files, the data needs to be assigned relevant virtual channels and application identifiers (APID) in conjunction with the rest of the data stream. Additionally, the system must be able to

prioritize different EMWIN messages; for instance, tornado alerts need to immediately move to the top of the priority list.

## 4.2 Data Rate Increase

On the GOES N-P series the EMWIN data rate is 19.2 Kbps and the LRIT data rate is 128 Kbps; this is a total of ~148 Kbps. The GOES-R HRIT/EMWIN transponder will be capable of supporting a 400 Kbps data rate (927 Kbps transmission rate when data encoding overhead is added). This represents more than a 150% increase in throughput; the new system must be able to maintain this data rate. The individual services will not be assigned a rigid portion of the overall bandwidth; the method of allocating bandwidth is described in section 5.3.4.3.

Table 7: Service Data Rates

SERVICE	DATA RATE
LRIT	128 kbps
EMWIN	19.2 kbps
HRIT/EMWIN	400 kbps

## 4.3 Data Encoding

The Space Segment (SS) to HRIT/EMWIN interface requirements have made some modifications to the data encoding to be used.

Table 8: Data Encoding Changes

ENCODING PARAMETER	CURRENT LRIT	HRIT/EMWIN
Line Coding Format	NRZ-L <sup>4</sup>	NRZ-M <sup>5</sup>
Pseudo-randomization polynomial	$h(x) = x^8 + x^7 + x^3 + I^6$	$h(x) = x^8 + x^7 + x^5 + x^3 + I^7$
Uplink filter	Raised cosine filter with a roll-off factor of $\alpha=0.5$	Square root raised cosine filter with a roll-off factor of $\alpha=0.3$ <sup>8</sup>

## 4.4 GOES-R Data

The GOES-R series of satellites is being designed with different science instruments than the current on-orbit satellites. The new instruments provide raw data in a different format and can be processed to generate a different set of products. As noted in section **Error! Reference source not found.**, the current LRIT system ingests GOES Variable Format (GVAR) data and internally generates products. If this model were to be maintained, the ingest function (current

<sup>4</sup> From LRIT Receiver Specs table 1

<sup>55</sup> DOMAIN-5FPS-77 requires HRIT/EMWIN to output data encoded IAW the SS to HRIT/EMWIN IRD. SS to HRIT/EMWIN IRD requirement SEMWRITIRD 66 states NRZ-M

<sup>6</sup> From LRIT Receiver specs section 3.8.4 De-randomization

<sup>7</sup> DOMAIN-5FPS-77 requires HRIT/EMWIN to output data encoded IAW the SS to HRIT/EMWIN IRD. SS to HRIT/EMWIN IRD requirement SEMWRITIRD 68 says to use a randomized bit stream IAW the CCSDS docs. Section 7.4.1 of CCSDS 131.0-B-1 TM synchronization and channel coding provides the polynomial.

<sup>8</sup> LRIT Transmitter specification section 9.5

Domain 1) and product generation function (current Domain 2/3) would need to be modified to process the data from the instruments being utilized on GOES-R and generate the new products. A study was conducted (GOES-R Product Acquisition Study) to determine whether this model should be maintained in the new system or if the data products can be obtained from a different source such as the ESPDS PDA; the study determined that the optimal design for HRIT/EMWIN was to utilize PDA for data acquisition and HRIT file formatting.

There is ongoing work determining which of the available GOES-R products will be broadcast through HRIT/EMWIN. Although there is an expectation that the new data stream will still include a visible image, an infrared image and a water vapor image similar to the current broadcast it is unknown specifically which GOES-R products will be used; this decision will be finalized by the HRIT/EMWIN program office after further consultation with end users. This will not affect the design and implementation of the system as the requirements call for a very flexible system that can accommodate varying user needs.

## **4.5 System Overlap**

The current date for GOES-R to become operational is mid 2017 as GOES-West; however GOES-S is not scheduled to become operational until mid 2020<sup>9</sup>. This leaves, at best, a period of three years where GOES-W will be utilizing HRIT/EMWIN but GOES-E will be utilizing separate LRIT and EMWIN. This time period could be extended significantly if there is a failure of GOES-R or GOES-S that causes an older satellite to be reactivated. Since LRIT still needs to be supported even after HRIT/EMWIN is operational, either the new system has to replicate all functions of the current system and perform all of the new functions OR the existing system must stay operational until the last pre-GOES-R satellite is fully retired. A study was performed to determine which path is optimal, replacing the current system with a new system that does both LRIT and HRIT/EMWIN or dropping a new HRIT/EMWIN next to the LRIT system; the study recommendation calls for a unified LRIT/HRIT/EMWIN processing system. The Program Management office accepted the recommendation and the developed HRIT/EMWIN system will need to support both LRIT and HRIT/EMWIN broadcasts.

## **4.6 Non GOES-R Changes**

### **4.6.1 Continuity and Availability Issues**

Issues included in this section are related to the continuity and availability of the current system. Several of these issues relate to normal maintenance and sustainment tasks that require the system to be shut down for periods of time. Due to the criticality of the data to the end users, and the potential human impact of the failure to send out timely warnings, the update HRIT/EMWIN requirements have fairly strict uptime requirements.

- a) The current architecture requires the system to be shut down to perform security and OS patches. This leads to reluctance to perform necessary updates due to the desire to maintain the continuous data flow.
- b) The interface between the NSOF and the Silver Spring NWS office is not sustainable over the long-term; this is the interface that provides the EMWIN data. Currently this is

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<sup>9</sup> Continuity of GOES Operational Satellite Programs (GOES Flyout Schedule)

a dedicated circuit using a discontinued UDS modem. The interface should be more consistent with other data transfer methods utilized throughout NOAA.

- c) Since the current LRIT system generates GOES products internally, the system must be modified any time the GOES science team modifies a product generation algorithm. Changing a product that is included in the data stream also requires significant modifications. The system would have to be shut-down to apply these modifications.
- d) Updating global parameters used in product generation, such as a satellite location, requires the system to be restarted.

#### **4.6.2 Monitoring**

The NSOF currently maintains two LRIT receive systems, one for GOES-East and one for GOES-West. The data feed is monitored by the NSOF helpdesk to ensure that there is data being received. This monitoring is entirely manual; any problem noted results in a phone call to support engineers who must manually resolve the issue. This creates a delay between anomaly onset and detection as well as between anomaly detection and resolution.

The proposed system would also maintain two receive systems for the HRIT/EMWIN data feeds. To reduce the time for anomaly detection and resolution, the new system will integrate the monitor function with the data generation system. Transmitted products could be compared against that which is received to ensure the integrity of the transmission; automated responses to detected signal problems should be configurable.

#### **4.6.3 GOES DCS DOMSAT Access**

Access to DOMSAT will not be available to the DCS program during the expected lifetime of the GOES-R mission. This leaves GOES-R as the only satellite broadcast source for GOES DCS data. As discussed in section **Error! Reference source not found.**, the current LRIT broadcast is the secondary broadcast source for DCS data. The design of the LRIT system results in latency in the DCS broadcast; this latency was acceptable because DOMSAT was the primary broadcast; this latency will need to be addressed. The new HRIT/EMWIN system will act as the primary GOES DCS broadcast and minimize the latency of DCS messages.

### **5. CONCEPT FOR HRIT/EMWIN**

#### **5.1 Background and Objectives**

The primary objective of the HRIT/EMWIN system will be to continue providing weather products, forecasts and alerts to LRIT and EMWIN users during the GOES-R lifetime through both the LRIT and HRIT/EMWIN broadcast streams. Secondary objectives include:

- i. Continuing to provide high-reliability in data transmission
- ii. Minimizing the impact of the HRIT/EMWIN changes to users
- iii. Improving the maintainability of the current system

#### **5.2 Operational Policies and Constraints**

The HRIT/EMWIN system will need to operate in accordance with NOAA/NESDIS operational policies. The applicable policies are referenced in the System Requirements Document (SRD) and include: NOAA IT Security Manual, Section 508 of the Rehabilitation Act (29 USC 749d) and the Telecommunications Act Accessibility Guidelines.



There are also space, power, and cooling constraints placed on the system due to the operational locations at NSOF and WCDAS. The portions of the HRIT/EMWIN system deployed at the WCDAS and the RBU must require equal or less, space, power and cooling than the equipment currently deployed there for LRIT. The portions of the HRIT/EMWIN system that are deployed at the NSOF and CIP must also require equal or less space, power, and cooling than the current LRIT components deployed there. These restrictions will be documented in the SRD.

### **5.3 Description of HRIT/EMWIN**

#### **5.3.1 The Operational Environment and its Characteristics**

HRIT/EMWIN is to be deployed as part of the NESDIS ESPDS. The goal of this environment is to integrate the three main functions of the ESPC into a single enterprise architecture; the primary functions are ingest, product generation and product distribution. The original LRIT system actually crosses all three functions. Since the HRIT/EMWIN system will not perform ingest or product generation, it will receive already-generated products from PDA, it falls squarely within the distribution segment of ESPDS. See the ESPDS documentation for more information on the operational environment.

#### **5.3.2 Major System Components and Interconnections among these Components**

The new HRIT/EMWIN system will need to perform all of the same basic functions as the original LRIT system, but does not need to be compartmentalized into the same domain structure. This document may use the phrase “domain” to help correlate the new system to the current system, but this is not intended to drive the design to follow the same structure and is used merely to help convey an understanding.

The notional architecture for the HRIT/EMWIN system (see Figure 4) looks very similar to the architecture of the LRIT system (see Figure 3). The following differences are noted:

- i. The new system will no longer ingest GOES Variable (GVAR) data but receive products from PDA.
- ii. The scope of the system has been expanded by moving the Domain-6 (User Segment) deployed at the processing center into the HRIT/EMWIN system; this will provide more timely and automatic feedback of system status.
- iii. LRIT file format has been augmented with HRIT files.
- iv. All of domain 1 is eliminated and part of domain 2/3 is unnecessary.

The elements of the HRIT/EMWIN system are shown within the large box. As shown in the figure, all of the domain 1 functions and some of the domain 2/3 functions are no longer necessary as the GOES-R Product Acquisition Study determined that the HRIT/EMWIN can acquire the GOES data it needs from the PDA.

#### **5.3.3 Interfaces to External Systems or Procedures**

The notional architecture presented in Figure 4 also shows the external interfaces into HRIT/EMWIN. There are three key classes of interfaces into and out of the system; the data acquisition interfaces, the antenna interface and satellite signal receiver.

### **5.3.3.1 Data Acquisition Interfaces**

The interfaces for data acquisition are listed in the following sections, but specific implementations of the interfaces will be left to the development contractor. The core of the HRIT/EMWIN data stream is: GOES products, EMWIN and GOES DCS data. Each of these core products will have a primary and backup data generation capability in geographically separated facilities.

#### **5.3.3.1.1 GOES Products**

The method of attaining GOES product data will be an internal ESPDS interface to PDA which will provide tailored products that meet the HRIT/EMWIN broadcast needs. The resulting products should be in the same format as the products transmitted today over LRIT. The expected format of the data after product generation is a set of segmented level 1b area files. A large image will be segmented into individual areas; the number of segments for each image is controlled by the software and is configurable. This way a large image can be transmitted as a set of area files that are then be re-assembled at the user segment. The HRIT/EMWIN system will need to know in which order the area files need to be assembled. The PDA will provide the data to HRIT/EMWIN already in LRIT/HRIT file format.

#### **5.3.3.1.2 EMWIN**

The EMWIN data is generated at the National Weather Service office in Silver Spring, MD. The method of attaining this data will be determined by the NWS Interface study which will be assigned to the development contractor after the work assignment is awarded. The method for attaining this data must take into consideration priority levels; for example, emergency alerts must be processed and transmitted prior to general forecast data.

#### **5.3.3.1.3 GOES DCS Data**

The HRIT/EMWIN system treats GOES DCS data as pass-through; i.e. the contents are unknown to, and unchanged by the HRIT/EMWIN system. The data is generated by the DCS project and assigned a priority level; the data is then provided to the HRIT/EMWIN interface along with a priority level. The HRIT/EMWIN system will treat the data in accordance with the designated priority and assign the data an appropriate virtual channel.

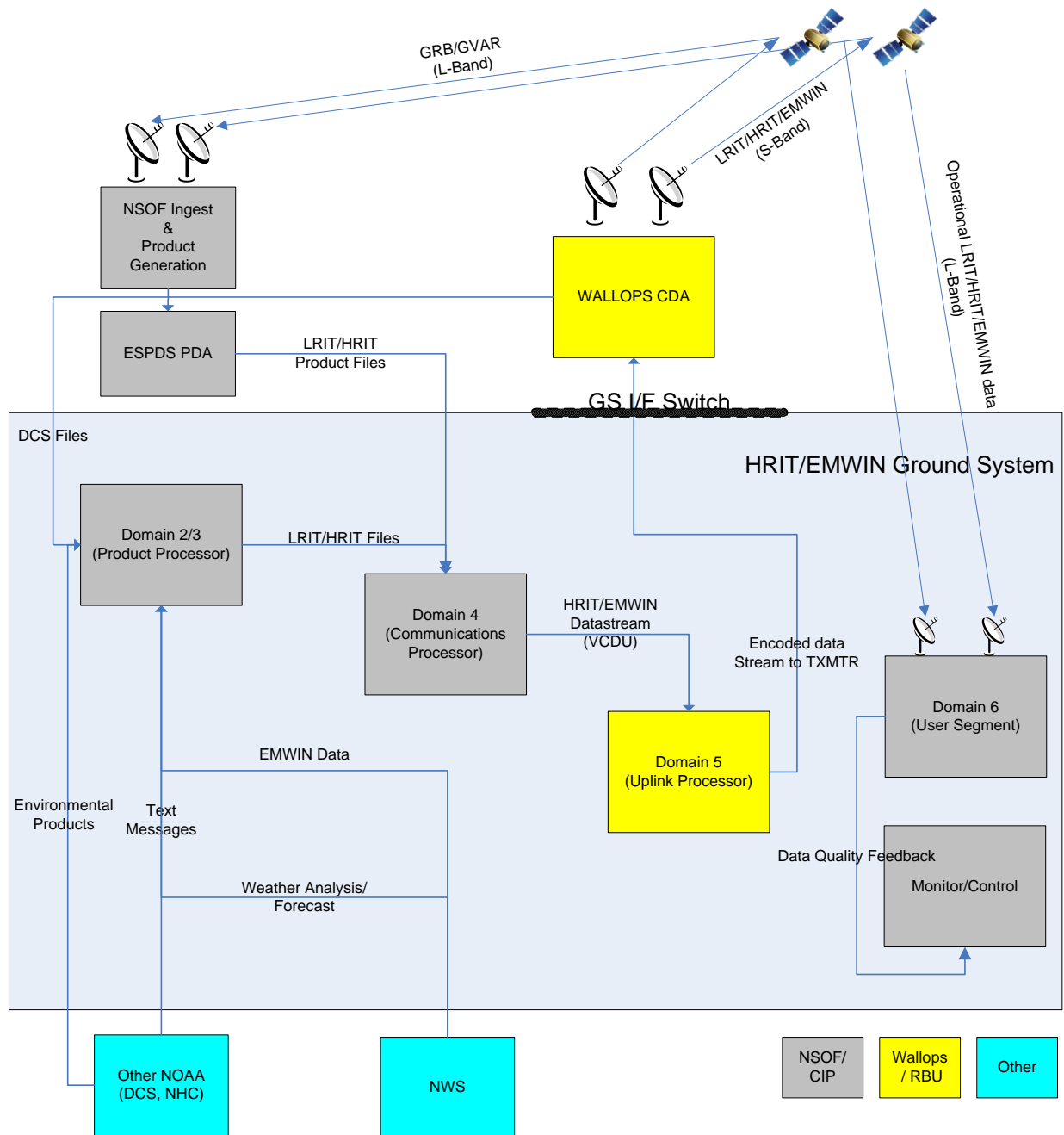


Figure 4: HRIT/EMWIN Notional Architecture

#### 5.3.3.1.4 Other Data

The HRIT/EMWIN system will be able to support any binary input. The following is a list of websites from which the current LRIT system extracts data; this will need to be supported in HRIT/EMWIN:

- <ftp://tgftp.nws.noaa.gov>
- <http://www.nhc.noaa.gov>

- <http://www.goes.noaa.gov>

#### **5.3.3.2 Antenna Interface**

The physical interface to the GOES-R GS antenna will be located at WCDAS in Wallops, VA and at the RBU in Fairmont, WV. The antenna interface has already been defined by the GOES-R program and is documented in the [Ground Segment \(GS\) to HRIT/EMWIN Interface Requirements Document \(IRD\)](#). The GOES-R GS will be responsible for performing the uplink of the HRIT/EMWIN signal.

The primary physical interface for the LRIT broadcast to GOES N-O-P will be located at the WCDAS in Wallops, VA. The backup antenna for GOES-W is located at the FCDAS in Fairbanks, AK and the backup for GOES-E is located at Goddard Space Flight Center (GSFC) in Greenbelt, MD.

#### **5.3.3.3 Satellite Signal Receiver**

There will be two user receive segments deployed with each instance of the HRIT/EMWIN system, one for the GOES-E signal and one for the GOES-W signal. This interface has already been defined by the GOES-R program and is documented in the [Space Segment \(SS\) To HRIT/EMWIN \(formerly known as EMWIN/LRIT\) Interface Requirements Document \(IRD\)](#).]

### **5.3.4 Capabilities/Functions**

#### **5.3.4.1 Prioritization**

The system must support a configurable prioritization scheme. Every data item in the system will need to be tagged with a priority that will affect the speed with which each particular data item will be processed while on the ground. Additionally, this prioritization should support a threshold above which flagged data will be transmitted multiple times; the number of retransmissions and the threshold should both be configurable. The ability to define priorities and assign them to individual products and classes of products must be available even while the system is still actively processing data.

#### **5.3.4.2 Virtual Channel Assignments**

The CCSDS standards that are utilized by HRIT/EMWIN allow each piece of data to be transmitted on its own Virtual Channel (VC); see [CCSDS Recommendation For Space Data System Standards: AOS Space Data Link Protocol](#) for more information on virtual channels. The HRIT/EMWIN system will be capable of assigning different data to specific virtual channels; this assignment could be per data-source, data-type or for specific products. For example, all data from GOES-R could be assigned to a single virtual channel or each product could get a specific virtual channel. The virtual channel assignments will be configurable in that new data products can be added and assigned a virtual channel and/or the virtual channel assignments of current products can be modified while the system is operational. Table 9 shows a sample of products and a possible virtual channel assignment although the final list will be expanded as the product suite is further defined.

Table 9: Sample Virtual Channel Assignments

Product Name	Source	Virtual Channel
GOES-R Visible	GOES-R	14
GOES-R Infrared	GOES-R	15
GOES-R Water Vapor	GOES-R	16
Tropical Storm Products	NOAA/NWS Hurricane Center	21
EMWIN Weather Alerts	National Weather Service	22
EMWIN Weather Forecast	National Weather Service	23
DCS (Normal Data)	NOAA/NESDIS/OSPO	24
DCS Tsunami Warning	NOAA/NESDIS/OSPO	25
Meteosat Second Generation (MSG)	NOAA/NESDIS/OSPO	26
MTSAT	NOAA/NESDIS/OSPO	27
Administrative Text Message	HRIT/EMWIN System Administrators	60

#### 5.3.4.3 Bandwith Allocation

The HRIT/EMWIN data broadcast is defined to support 400kbps of data transfer (927kbps total transmission rate with encoding overhead). To ensure optimal utilization of the available bandwidth the system will allow the operators to control how bandwidth is allocated in the broadcast.

The system will support minimum guaranteed bandwidth levels that can be applied to bandwidth groups. Bandwidth groups can contain one or more virtual channels; a group may also be defined based on priority levels regardless of virtual channel. Bandwidth groups will be configurable such that the virtual channels that are part of the group can be modified and/or the minimum guaranteed bandwidth can be modified while the system is running. This bandwidth guarantee is not intended to show any expected bandwidth usage, just the minimum that is *guaranteed* for the given group. The HRIT/EMWIN program office does not expect that each bandwidth group will always utilize all of its given allocation; some bandwidth groups may utilize only a small portion of the guarantee while others will be consistently above. The program office will ensure a percentage of the total available bandwidth is not guaranteed to any individual bandwidth group; this will allow for high priority data to efficiently move through the system and allow for future expansion.

The HRIT/EMWIN system will constantly monitor the data currently in the queue and determine the bandwidth required for each bandwidth group. Whenever a bandwidth group does not need all that it is guaranteed, the system shall allocate the excess bandwidth to those groups that have additional data currently ready. The system will allocate the excess bandwidth based on the

priority of the available data; higher priority data will be given preference and allowed to leave the system faster.

#### 5.3.4.4 Data Formatting

The current LRIT documentation details the required formatting of the data prior to transmission. With the exception of the physical layer, the formatting of the data will remain consistent with this model which is described in section **Error! Reference source not found.** of this document. Note that the HRIT files to be used in HRIT/EMWIN are exactly the same as LRIT files and are both defined in the same CGMS specification. The physical layer is the interface with the GOES-R GS antennas and the required formatting is described in the [Ground Segment \(GS\) to HRIT/EMWIN Interface Requirements Document \(IRD\)](#) which includes adding Reed-Solomon and convolutional encoding.

#### 5.3.4.5 GOES-E and GOES-W Data Tailoring

The HRIT/EMWIN system will produce six distinct data streams (up to three simultaneously):

- 1) GOES-East HRIT/EMWIN
- 2) GOES-West HRIT/EMWIN
- 3) GOES-East LRIT
- 4) GOES-West LRIT
- 5) Other GOES (typically over South America) HRIT/EMWIN
- 6) Other GOES (typically over South America) LRIT

With the exception of the GOES product data, the East and West streams are identical. The GOES-E broadcast only distributes products that were generated on GOES-E and the GOES-W broadcast only contains data generated on GOES-W. Each data stream will be presented to the appropriate antenna for uplink to the correct GOES satellite. The LRIT streams will need to maintain the current LRIT structure, i.e. virtual channel assignments and EMWIN packaging as standalone LRIT files.

When there is an available GOES over South America, the program will generate a broadcast customized for that geographic area. The specific satellite is usually one that has been retired from operations over the United States but is healthy enough for operations.

#### 5.3.4.6 Product Scheduling

The HRIT/EMWIN users expect to receive some of their data according to a set schedule. The system will allow for the operators to schedule a timeline for recurring data products, while still allowing for as-needed and constant-flow data. The system will monitor data currently in the queue including the utilized bandwidth and warn operators if the defined schedule will not be maintained within a configurable time window. When the system detects that the schedule is slipping, it will increase the priority of items that are behind schedule, within a configurable range, to allow access to any excess bandwidth allocation. Although the expected schedule for HRIT/EMWIN products has not yet been defined the current LRIT schedule is represented in Table 10. The final HRIT/EMWIN broadcast schedule will be defined by the HRIT/EMWIN program office after consulting with end users; this schedule may not be finalized until after the HRIT/EMWIN system is completed.

Table 10: LRIT Broadcast Schedule

Product Name	Format	Schedule
<b>GOES East</b>	Imagery: 1. Visible. 2. Infrared. 3. Water Vapor.	GOES Schedule <sup>10</sup>
<b>GOES West</b>	Imagery: 1. Visible. 2. Infrared. 3. Water Vapor.	GOES Schedule <sup>11</sup>
<b>Tropical Storm Products</b>	Graphic	Hourly
<b>EMWIN</b>	Text	As Received
<b>DCS</b>	Text	As Received
<b>Meteosat Second Generation (MSG)</b>	Graphic	Hourly
<b>MTSAT</b>	Graphic	Hourly
<b>Administrative Text Message</b>	Text	Hourly (or As needed)

#### 5.3.4.7 Contingency Automation

The system will be configurable to define a set of known anomalies and contingency procedures. The system will be able to detect hardware anomalies, such as disk failures and system anomalies such as internal or external interfaces being unavailable. The system will also monitor the data (as in section **Error! Reference source not found.**) to find anomalies. The contingency procedures may take the form of a manual procedure presented to the operator or an automated procedure that takes action within the system.

#### 5.3.4.8 Data Quality and System Monitoring

The system will monitor data from the time it is input into the system until the data is sent to the antenna for transmission to the space segment; it will then monitor the transmitted signal to continue tracking the data. The deployed ground segment will include two copies of the user segment; one to receive data broadcast from GOES-E and one for GOES-W. The received data will be checked by the HRIT/EMWIN system to ensure that the data being received matches the data that was sent. If problems are detected with the data, the system will act based on the configurable set of contingency procedures. Depending on the detected problem, and the priority of the data to which it applies, the system may simply generate an event message, explicitly notify the operator, or it may take more direct automatic action such as rebroadcasting a product.

<sup>10</sup> <http://www.oso.noaa.gov/goes/schd-sector/index.htm>

<sup>11</sup> <http://www.oso.noaa.gov/goes/schd-sector/index.htm>

#### **5.3.4.9 Fill Data**

The GOES-R GS antenna is expecting a constant stream of 400kbps data (GOES N-O-P is expecting 128Kbps), to ensure this is maintained, the HRIT/EMWIN system will need the capability to add fill-data to the stream as necessary. The CCSDS data format specifies that any packet tagged as virtual channel 63 is fill data. During periods where the system is running at or near capacity and only a small amount of fill data is necessary, the system should utilize packets labeled as fill data. During periods where the data flow is below capacity and fill data is frequently required, the system will use the extra bandwidth to rebroadcast products. The rebroadcast threshold and the products to be rebroadcast will both be configurable by the user while the system is operational.

#### **5.3.4.10 Rolling Rebroadcast**

Some HRIT/EMWIN users are expected to be mobile; i.e. their receive equipment is not permanently in place and receiving data. Since these users are not capturing data at all times, whenever they setup in a new location they might not have any knowledge of previous broadcast. For example, EMWIN provides weather predictions and alerts as soon as they are available; mobile users will not know the current broadcast until they have been up and receiving data for a period of time. For these users the ability to quickly catch-up on recent broadcasts once they are in a new location can be very useful. Data designated for rolling rebroadcast will be packaged and retransmitted, using unutilized bandwidth, every X minutes. The system will be configurable to specify what products will be part of this rebroadcast, the frequency of the rebroadcast, the max age of items contained in the broadcast. The data in the rolling rebroadcast will be compressed and transmitted as a single file and can be treated like any other data item in the system (i.e. assigned a priority, assigned a virtual channel etc).

### **5.3.5 Charts and Accompanying Descriptions**

The following figures already in this document show a general data flow through the system:

- Figure 1: HRIT/EMWIN OV-1
- Figure 4: HRIT/EMWIN Notional Architecture

### **5.3.6 Performance Characteristics**

The exact data latency requirements are to be determined but will be different depending on the source and priority of each product. For example, a weather alert may need to be through the system and to the space segment within 15 seconds, but a GOES-R Visible image may allow for 60 seconds of latency.

### **5.3.7 Quality Attributes**

The reliability, maintainability and accessibility requirements for the system are defined in the HRIT/EMWIN SRD and will not be reproduced here. This section will include a brief explanation of why the chosen quality attributes are important and to justify the need for an off-site backup facility.

The timely transmission of weather warnings and alerts through HRIT/EMWIN is important to the safety of American citizens and to those people in foreign countries that lie within the broadcast footprint of the GOES satellites. Without accurate and current forecasts and alerts,



lives may be lost in emergencies such as tornados and tsunamis. Even if there is no impending emergency, for some international users in Central and South America, this data stream represents their only reliable source of weather information for local forecasting.

Due to the importance of the system to the end users, the up-time requirements are relatively strict. No matter how resilient the internal workings of the system, a natural disaster or other incident may cause the facility housing the system to become unavailable. Since this mission needs to be maintained at all times, there also must be an off-site backup facility in case a prime facility down. The GOES-R program is providing an antenna at two locations: WCDAS in Wallops, VA and the RBU in Fairmont, WV. For GOES N-O-P, primary uplink is at the WCDAS with GOES-E backup located at GSFC in Greenbelt, MD and GOES-W backup located at the FCDAS in Fairbanks, AK.

The core HRIT/EMWIN products all have at least two data generation points. EMWIN data is generated primarily in Silver Spring, MD but can also be generated at the Backup Telecommunications Gateway (BTG) located in Mt. Weather, VA. The GOES-R products will have primary production at the NSOF; these products can also be generated by the GOES-R GS RBU and accessed via the ESPDS backup at the Critical Infrastructure Protection (CIP) facility located at Wallops Island, VA. It is also possible, pending the results of the GOES Product Acquisition study, that the backup GOES-R product generation functionality will be inside the backup HRIT/EMWIN system. Finally, the primary source for GOES DCS data is at the NSOF while the alternate site is WCDAS.

The HRIT/EMWIN data acquisition and broadcast formatting functionality will exist primarily within the NSOF in Suitland, MD but will have a backup facility at the CIP. Both the prime and backup systems will need to be able to acquire data from the primary and backup facilities for each of the core HRIT/EMWIN products. Additionally, both the NSOF and CIP systems will need to interface with both the WCDAS and the RBU antennas. For purposes of this document CIP has been assumed for the HRIT/EMWIN backup only because that is the currently defined location for the ESPDS backup and the HRIT/EMWIN should be co-located with the rest of the ESPDS.

### **5.3.8 Provisions for Safety, Security and Privacy**

Covered under section 5.2.

## **5.4 Users/Affected Personnel**

### **5.4.1 Operators**

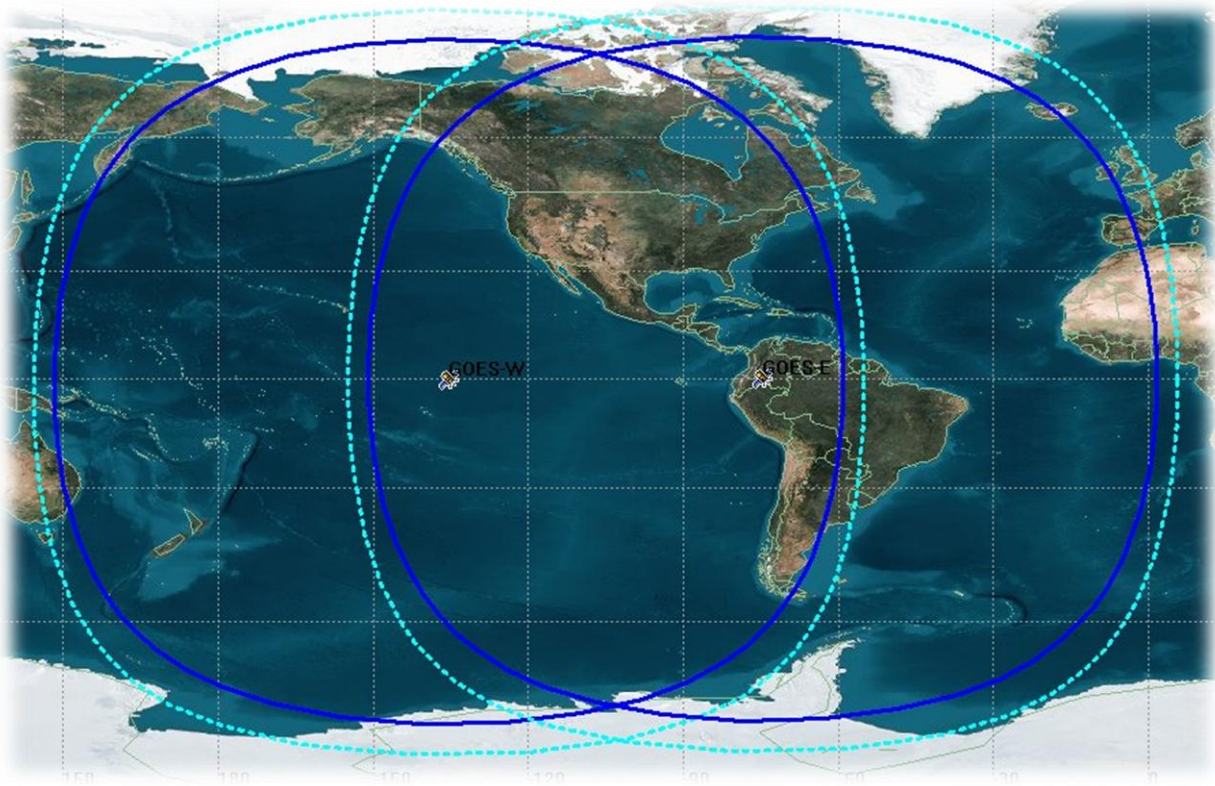
The operators of the system will need training on the changes to the system. The development contractor will provide user's manual and training documentation per the Statement of Work (SOW).

### **5.4.2 Users**

The users of the HRIT/EMWIN broadcast will be affected most by the changes that the GOES-R program already defined: the data rate increase, the signal characteristics and the merging of the signals. This will require the end users to update their user segment. LRIT or EMWIN antennas should be able to receive the new service, but a different receiver will be needed to decode the newly modified signal. The GOES-R program has created a prototype receiver that can not only

process the future signal, but is backwards compatible with the current services. This demonstrates the feasibility of a low-cost receiver upgrade path for users to implement before GOES-R is operational, without disrupting the ability to process the existing signals.

One change that is caused by the data rate increase is a modified satellite coverage zone for EMWIN users. The current EMWIN signal can be received by any user that has line of sight visibility of GOES-E or GOES-W with an elevation of one degree or greater. The new merged signal will require the elevation angle to be five degrees or greater; LRIT is currently five degrees so there is no affect on LRIT users. Figure 5 shows the lost coverage area; the solid dark-blue line shows the HRIT/EMWIN coverage while the dashed light-blue line shows the coverage area of the current EMWIN service.



**Figure 5: EMWIN and HRIT/EMWIN Coverage Area Difference**

The users will also be affected by the different products available from GOES-R and the method of applying virtual channels which is to be applied in this system. The HRIT/EMWIN program is working with users to determine which new GOES-R products represent the optimal set. Members of the team will also be attended the GOES Users Conference (GUC) to brief users on the expected changes.

#### **5.4.3 Manufacturers**

Since NOAA does not make any of the user equipment, the changes made to the broadcast characteristics need to be communicated with the community of manufacturers. The

HRIT/EMWIN IPT has already discussed contacts with various manufacturers and is expecting to provide preliminary information at the GUC.

## 6. NOTES

### 6.1 Acronyms

AD	Applicable Document
AFEP	Advanced FEP
APID	Application ID
ASCII	American Standard Code for Information Interchange
ASM	Attached Synchronization Marker
CADU	Channel Access Data Unit
CCSDS	Consultative Committee for Space Data Systems
CIP	Critical Infrastructure Project located at Wallops Island.
CRC	Cyclic Redundancy Check
CVCDU	Coded Virtual Channel Data Unit
DCP	Data Collection Platform
DCS	Data Collection System
EMWIN	Emergency Manager Weather Information Network
ESPDS	Electronic Satellite Processing Distribution System
FCDAS	Fairbanks Command and Data Acquisition Station
GMT	Greenwich Mean Time
GOES	Geostationary Operational Environmental Satellite
GS	Ground Segment
GUC	GOES User Conference
HRIT	High Rate Information Transmission
IF	Intermediate Frequency
ICD	Interface Control Document
IPD	Information Processing Division
IPDU	Internet Protocol Data Unit
LRIT	Low Rate Information Transmission
McIDAS	Man computer Interactive Data Access System
M-PDU	Multiplexing Protocol Data Unit
NCEP	National Centers for Environmental Prediction
NESDIS	National Environmental Satellite, Data, and Information Service

NESDIS	National Environmental Satellite, Data, and Information Service
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NOAA	National Oceanic and Atmospheric Administration
NSOF	NOAA Satellite Operation Facility
NSOF	NOAA Satellite Operations Facility
OPDB	Operational Products Development Branch
OSDPD	Office of Satellite Data Processing and Distribution
OSO	Office of Satellite Operations
OSPO	Office of Satellite & Product Operations
PAL	Product Area Leader
PD	Product Distribution
PDA	Product Distribution and Access
PIB	Product Implementation Branch
RD	Reference Document
SCID	Spacecraft ID
SOW	Statement of Work
SSD	Satellite Services Division
UTC	Universal Time Coordinated
VCDU	Virtual Channel Data Unit
VCID	Virtual Channel ID
WCDAS	Wallops Command and Data Acquisition Station



# **NOAA ESPDS Work Assignment 8**

## **GCOM**

### **Independent Government Cost Estimate (IGCE)**

**Version 1.0**  
**September 2012**



U.S. Department of Commerce (DOC)  
National Oceanic and Atmospheric Administration (NOAA)  
National Environmental Satellite, Data, and Information Service (NESDIS)  
Office of Systems Development (OSD)  
Ground Systems Division (GSD)

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- **Working copy or Draft:** a document not yet finalized or ready for distribution; sometimes called a draft. Use 0.1A, 0.1B, etc. for unpublished documents.
- **Final:** the first definitive edition of the document. The final is always identified as Version 1.0.
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# **1 INTRODUCTION**

This report is an IGCE for ESPDS Work Assignment 8 for GCOM based on the Work Assignment Statement of Work which includes assumptions and other data provided by NOAA Systems Engineers collected to date. Currently, the architecture and system requirements are still being written and the ultimate proposed solution and schedule may be adjusted.

## **1.1 DEFINITION**

An Independent Government Cost Estimate (IGCE) is an independent estimate of the total price of building, testing, integrating and delivering a complete IT hardware and software system that meets the requirements in the Request for Proposal (RFP). The IGCE is used in both the price analysis of an offeror's proposed price and the cost analysis of separate cost elements and profits in of an offeror's or bidder's proposal. See Federal Acquisition Regulations (FAR) section 15.404-1 Proposal Analysis Techniques, Section 15.404-1 (7) (b) Price Analysis (2) (v) IGCE and (c) Cost Analysis (2) (iii) (D) IGCE.

## **1.2 SCOPE**

The preliminary IGCE is a proposed price estimate of the primary development contractor (and sub-contractors). Because the IGCE is used in the acquisition process for the primary contractor, the cost of government personnel and additional support contractors is not included.

## **1.3 METHODOLOGY FOR COST ESTIMATION**

Cost Estimation is the process of determining the expected costs of the project. It is a broad subject with many branches with many varying methods. There are overall strategies to determining the cost of the overall project, as well as individual methods of estimating costs of specific types of activity.

GAO recently audited cost estimation methodologies used by Department of Commerce agencies, and found that the majority of IGCE development activities utilize the parametric estimation model, which uses mathematical methods to find correlations but does not build an estimate together piece by piece in a well-defined systems analysis. The result of these studies have led towards a shift towards the use of bottom-up estimation.

### **1.3.1 BOTTOM-UP ESTIMATING**

Bottom-up estimating consists of examining each individual work package or activity and estimating its costs for labor, materials, facilities, equipment, etc. This method is the most time consuming and laborious but usually results in extremely accurate estimates if well prepared detailed input documents are used.



## 2 BASIS OF ESTIMATE (BOE) ASSUMPTIONS

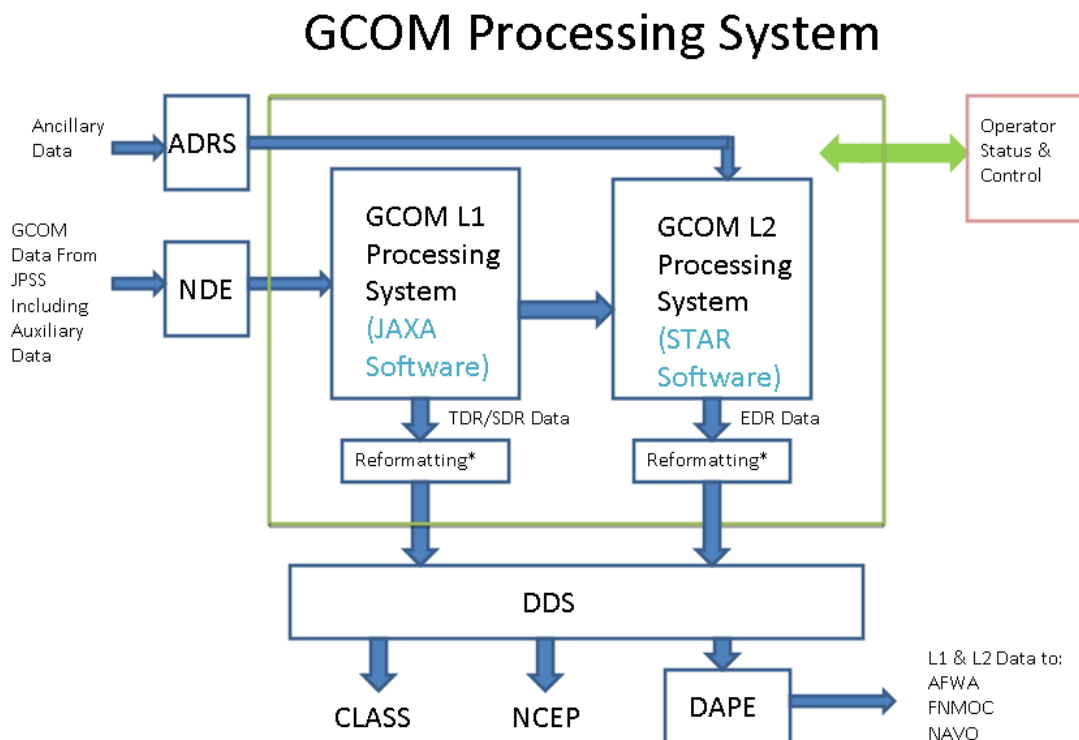
Assumptions are broken down into separate sections to maintain granularity. Labor costs reflect a 3% per annum escalation, unless Contractor specific pricing reflects a different rate.

### 2.1 SUMMARY

The summary estimate of the IGCE reflects a total of **\$1,677,848.57** from a projected start/award date of November 1, 2012 to October 30, 2016.

### 2.2 NOTIONAL SYSTEM ARCHITECTURE

The GCOM-W1 Processing and Distribution System (GPDS) Architecture is to be developed as part of the existing Environmental Satellite Processing and Distribution System (ESPDS). The figure below shows the linkages to the JPSS Ground Segment and distribution to operational users based on the current ESPC systems architecture. The Interface Data Processing Segment (IDPS) of JPSS will provide RDRs (Raw Data Records) from the GCOM-W1 satellite via a fiber channel connection between the IDPS and ESPC (NDE) SANs. The NDE will then make the RDRs available to the GPDS.



### 2.3 COMMERCIAL-OFF-THE-SHELF (COTS) HARDWARE AND SOFTWARE

The following are the assumptions of the IGCE for the use of COTS Hardware and Software. The IGCE:

- Assumes the purchase and use of COTS Hardware and Software for the GCOM task.
- Assumes the utilization of new COTS Hardware and Software for the development, implementation and operation of GCOM.
- Assumes there will be a hardware refresh of the current operational GCOM hardware.
- Assumes the majority of the COTS Hardware and Software will be acquired through the ESPDS Development Contractor.

## **2.4 LABOR CATEGORIES AND RATES**

The following are the assumptions of the IGCE regarding labor rates and categories. The IGCE:

- Assumes the labor categories utilized in ESPDS Development remains a static element, and as such the IGCE utilizes historical staffing plans and program budgets to determine the Contractor Team. NOAA GSD engineers who advise the Government and provide oversight of the ESPDS Development task developed the staffing plan for this task for labor and cost estimation purposes.
- Assumes the labor rates are provided and escalated rates based on contractually obligated escalation as per GSA Alliant Task Order R1BK13090030.
- Assumes a labor escalation of 3.0% as specified under the Task Order.

## **2.5 COST LOADING FACTORS**

The following are the assumptions of the IGCE regarding cost loading factors. The IGCE:

- Assumes Fringe is a cost loading factor at 46% of the direct labor rate based on Solers current pricing.
- Assumes Overhead is a cost loading factor at 17% of the direct labor rate.
- Assumes a Computer Center charge, a Solers-developed cost that was proposed and accepted by the Government, at \$5.50 per hour of labor. This per hour charge is expected to increase by 3.0% each year.
- Assumes a G&A (for labor) cost loading factor of 9% of the sum of direct labor, fringe, overhead, and computer center.
- Assumes a base fee of 2% on the sum of direct labor, fringe, overhead, computer center and G&A.
- Assumes an award fee of 8%, which is pooled but not guaranteed. 8% is used for estimation purposes as a maximum.
- Assumes a G&A (for ODCs) cost loading factor of 9% on all ODCs including travel and materials.
- Assumes a GSA Contract Access fee of 2% on total expenses.

## **2.6 TRAVEL**

The following are the assumptions of the IGCE regarding travel. The IGCE:

- Assumes travel costs are based upon US Government per diem travel rates.
- Assumes the travel costs for US Government employees are not included.
- Assumes that all travel incurred on this task will be considered local within the Greater Washington DC Metropolitan area and travel to other NOAA sites outside this region will not occur.

### 3 INDEPENDENT GOVERNMENT COST ESTIMATE

Click on the icon to view the IGCE in a separate Adobe PDF window.



GCOM Work  
Assignment - GCE



ESPDs Development IGCE for Work Assignment 8 - GCOM  
Independent Government Cost Estimate  
Cost Detail

COST LOADING FACTORS						OY2 - Feb 1, 2012 to Jan 31, 2013 (CONTRACTUAL BENCHMARK)				OY3 - Feb 1, 2013 to Jan 31, 2014 (ESCALATED)				OY4 - Feb 1, 2014 to Jan 31, 2015 (ESCALATED)				OY5 - Feb 1, 2015 to Jan 31, 2016 (ESCALATED)				OY6 - Feb 1, 2016 to Jan 31, 2017 (ESCALATED)				TOTAL			
	Fringe	Overhead	G&A	Base Fee	Award Fee Pool	Comp Center																							
	46.00%	17.00%	9.00%	2.00%	8.00%	\$5.50																							
Labor Category	Location	Contractor	Task				%	Hours	Rate	Cost (TY\$)	%	Hours	Rate	Cost (TY\$)	%	Hours	Rate	Cost (TY\$)	%	Hours	Rate	Cost (TY\$)	%	Hours	Rate	Cost (TY\$)	Total Hours	Total Cost (TY\$)	
<b>Labor</b>																													
Systems Engineer (Senior)	Onsite / Offsite	Solers	Engineering	Mapped to Systems Engineer (Journeyman)																									
Subject Matter Expert (Master adjusted on Actual)	Onsite / Offsite	Solers	Engineering	Mapped to Subject Matter Expert (Master)																									
Network Engineer (Senior)	Onsite / Offsite	Solers	Engineering	Mapped to Systems Engineer (Journeyman)																									
Systems Engineer (Senior)	Onsite / Offsite	Solers	Engineering	Mapped to Systems Engineer (Journeyman)																									
Fringe																													
Overhead																													
Computer Center																													
G&A on Labor																													
Base Fee on Labor																													
Award Fee on Labor																													
<b>TOTAL DIRECT + INDIRECT LABOR</b>																													
<b>Materials &amp; ODCs</b>																													
Travel	ODC																												
Server + Rack Hardware	Hardware																												
SAN Storage	Hardware																												
Network Router	Hardware																												
Firewall	Hardware																												
<b>G&amp;A on Materials &amp; ODCs</b>																													
<b>TOTAL MATERIALS &amp; ODCs</b>																													
<b>Totals and Other Fees</b>																													
Subtotal																													
GSA Contract Access Fee @ 2% (Total Cost / 1.02)																													
<b>GRAND TOTAL</b>																													

b(4)

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 025		3.EFFECTIVE DATE 04/04/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 01/09/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 52.232-22 Limitation of Funds</b>				
<b>E. IMPORTANT:</b> Contractor IS NOT required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:04/02/2013		Quote Dated:04/02/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)b				
This Modification obligates funds to Option Period 2 of the Contract as set forth on the attached continuation page. <b>FOR INQUIRIES REGARDING PAYMENT CONTACT:</b> GSA Finance Customer Support 816-926-7287				

PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino b(6)	
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 04/04/2013
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	



# **Environmental Satellite Processing and Distribution System (ESPDS) Development**

## **Work Assignment 11: National Environment Satellite, Data, and Information Service (NESDIS) Consolidated Back Up (CBU)**

**Version 1.0**

**April 2013**



U.S. Department of Commerce (DOC)  
National Oceanic and Atmospheric Administration (NOAA)  
National Environmental Satellite, Data, and Information Service (NESDIS)

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# 1 Introduction

The ESPDS (Environmental Satellite Processing and Distribution System) development contractor is the process of creating several new subsystems within the ESPC including the Suomi National Polar-orbiting Partnership (SNPP) Data Exploitation (NDE) system and the Product Distribution and Access (PDA).

Many of the data, products, and services provided by the Environmental Satellite Processing Center (ESPC), specifically via NDE and PDA, directly contribute to the issuance of life saving NWS watches and warnings to the public. These systems and their data products are used by the NWS and Department of Defense (DoD) as inputs to analyses and forecast models. As such, they fall under Homeland Security Presidential Directive (HSPD) - 7 Critical Infrastructure Protection Plans to Protect Federal Critical Infrastructure such as ESPC. Additionally, the ESPDS development contractor is required to develop solutions that adhere to NIST 800-53 applicable controls for a system rated as HIGH. NIST 800-53 guidance includes a Contingency Planning Control (CP). CP control number 7 states that systems rated as HIGH must have an alternate processing site deployed and configured to take over essential functions; NESDIS has identified Product Generation (NDE) and Product Distribution (PDA) functions as essential. Therefore, a backup operational capability is required for these essential functions should a disaster render the primary ESPC, located at the NOAA Satellite Operations Facility (NSOF), inaccessible or inoperable.

In the summer of 2012 NESDIS management identified that all backup processing and distribution capabilities would no longer be deployed to WCDAS in Wallops Island, VA but to the Vertex Building in Fairmont, WV; this Fairmont facility will be known as the Consolidated Backup (CBU). To comply with Government mandates such as HSPD-7 and NIST 800-53 there is a requirement for the NDE and PDA subsystems to have a backup deployed to the CBU. As the ESPDS development contractor is in the process of creating the first instantiations of PDA and NDE at the NSOF they are the only contractor that could perform this task at the CBU. Currently the CBU is only a facility with power and cooling and contains no ESPC related computing infrastructure. At the primary site (NSOF) the PDA and NDE are being deployed into the existing ESPC computing infrastructure and as such are able to leverage ESPC IT Services (such as Active Directory and DNS), Security Services (such as TripWire logging) and Network Services (such as firewalls and routing). Since the CBU does not currently have these capabilities, they will need to be deployed there as well for the PDA and NDE to function. These critical ESPC services fall under the Infrastructure segment defined in the ESPDS SOW and need to be deployed as part of this ESPDS task.

## 1.1 Scope

The scope of the National Environment Satellite, Data, and Information Service (NESDIS) Consolidated Back Up (CBU) Work Assignment is to provide the following Environmental Satellite Processing Center (ESPC) systems, functions and services required for NESDIS to meet Government mandated backup capabilities in space provided by NOAA at the Vertex Building in Fairmont, WV and to support transition to operations:

- Suomi National Polar-orbiting Partnership (SNPP) Data Exploitation (NDE) 2.0 system as defined in the NDE2.0 System Requirements Document (SRD)
  - The NDE 2.0 system is not expected to have an I&T environment or development environment located at the CBU
- Product Distribution and Access (PDA) system as defined in the PDA SRD, the ADRS SRD and augmented in the CBU SRD.
  - The PDA and ADRS systems are not expected to have an I&T environment or development environment located at the CBU
- Internal information technology (IT) security (e.g., zoning, firewall) as an extension of the ESPC security boundary
- Routing
  - Internal ESPC data; this includes data from other ESPC sites (i.e. WCDAS, NSOF) over NWAVE.
  - GOES-R and JPSS data to/from ESPC within the Vertex Building
  - Between ESPC and external data customer provided Points of Presence (POPs) within the Vertex building
- Enterprise services (e.g., Domain Name System (DNS), Lightweight Directory Access Protocol (LDAP), Active Directory, network/performance monitoring) to support NDE, PDA, routing, and IT security.

Collectively this scope will be referred to as ‘NESDIS CBU’ in this Work Assignment.

## 1.2 Terminology

The term “shall” designates a requirement. The terms “will” and “is” designate statements of fact.

The term TBS means “to be supplied” by the Government, and its use identifies missing or incomplete information, values, or data needed to fulfill a requirement.

The term Days means, unless indicated otherwise, calendar days.

The terms KTR and K mean the development contractor.

The terms Gov, Govt and G mean the Government.

## 1.3 Applicable and Reference Documents

The WA Applicable and Reference Documents Lists are supplied as Appendix A, listing each of the documents and information sources that are relevant to this WA. Applicable documents typically are Government-prepared and controlled documents and industry standards documents. Reference documents are intended to amplify or clarify the information or requirements presented in a document.

The applicable documents cited within this WA form a part of the WA as specified.

## 1.4 Delivery Dates

The CBU development effort shall be completed in order to meet the critical events as defined in Table 1. Development work can continue beyond the current contract Option Period two subject to the exercise of contract Option Periods.

## 2 Technical Management

As part of the Post-Award Conference, the Contractor **shall** perform a line-by-line review of the development schedules and the requirements documents identified as Applicable documents and Table 1.

The Contractor **shall** provide contract deliverables in accordance with the ESPDS Contract Data Requirements List (CDRL/DID) as clarified in Appendix B.

The Contractor **shall** define and schedule the NESDIS CBU milestones and activities that will be completed as part of this Work Assignment, including the critical events listed in Table 1, and all other related reviews and technical meetings, integration and test events, and capability readiness dates.

The Contractor **shall** adjust plans, schedules and resources as a result of Government controlled changes in critical event milestones.

**Table 1 NESDIS CBU Critical Events (TBR)**

<b>Event</b>	<b>Date Establishment</b>	<b>Date Control</b>
ESPDS NESDIS CBU WA Award ( <i>Planned</i> )	24 June 2013	Govt
ESPDS SRR/SDR	10 July 2013	Govt
ESPDS PDR	27 Aug 2013	Govt
ESPDS CDR	16 Oct 2013	Govt
PDA Readiness for Initial JPSS Testing at CBU	1 July 2014	Govt
JPSS GS Joint SAT Ready	6 Mar 2015	Govt

The Contractor **shall** incorporate milestones and activities into the ESPDS Integrated Master Plan [PM 2] and ESPDS Integrated Master Schedule [PM 7].

The Contractor **shall** identify action items within the ESPDS Master Action Item Database.

The contractor **shall** make any necessary updates to the Configuration Management Plan [CC 8] to ensure the plan addresses the additional site and compliance with applicable NIST 800-53 CM controls and NIST SP 800-128, Guide for Security-Focused Configuration Management of Information Systems.

The Contractor Configuration Control Board (CCB) **shall** include Government participation in the review and approval of changes to hardware, software, and documentation.

### 3 System Engineering and Integration

The Contractor **shall** perform all NESDIS CBU systems engineering and integration functions that are necessary for the requirements development, definition, design, integration, and testing of all requirements, as specified in the NESDIS CBU Requirements Document.

The Contractor **shall** conduct formal reviews, including the Initial Baseline Review (IBR), System Requirements Review System Design Review (SRR/SDR) [RE 4], Preliminary Design Review (PDR) [RE 5], Critical Design Review (CDR) [RE 6] Test Readiness Reviews (TRRs) [RE 1], Pre-Ship Review (PSR) [RE 2], Operational Readiness Reviews (ORR) [RE 7], and System Acceptance Reviews (SAR) [RE 8] with content, entrance criteria, and exit criteria as defined by the ESPDS Systems Engineering Management Plan.

The Government **will** utilize a JPSS provided NASA Integrated Independent Review Team (IIRT) in support of SRR/SDR, PDR and CDR events.

The Contractor **shall** designate a NESDIS CBU systems engineer to conduct and coordinate day-to-day systems engineering activities related to ESPC operations at the CBU, and to act as the technical interface to the Government.

The Contractor **shall** ensure that the ESPDS Operations Concept [SE 3] describes NESDIS CBU operations.

The Contractor **shall** update the Enterprise ‘To Be’ Architecture [SE 2] to include the architectural impacts of ESPC operations at the CBU.

The Contractor **shall** leverage existing ESPDS infrastructure and enterprise capabilities wherever practical and reasonable.

#### 3.1 Work Assignment Coordination

The Contractor **shall** provide access for representatives authorized by the Government, to attend reviews, to access data and documentation on the Contractor information-sharing portal, and to participate in technical interchange meetings.

The Contractor **shall** provide technical support and resources, as directed by the Government, to participate in Integrated Project Teams (IPTs) and other technical interchange meetings and working groups.

The Contractor **shall** provide technical support and resources, as directed by the Government, to participate in and present status at JPSS formal reviews, NOAA JPSS Office (NJO) reviews, and other NESDIS reviews.

The Contractor **shall** work with vendors, through the Government, to evaluate technology and implementation alternatives to NESDIS CBU enterprise services, routing services, and IT security services.

The Contractor **shall** work with external project offices (e.g. JPSS Ground Project, GOES-R Project Office, CLASS), through the Government, to identify potential interface simulation tools necessary to support development and testing activities.

The Contractor **shall** work with the Office of Satellite and Product Operations (OSPO) ESPC Operations and Maintenance (O&M) contractor, through the Government, to integrate NSOF and CBU ESPC operations and maintenance.

The Contractor **shall** work with OSPO ESPC O&M contractor, through the Government, to coordinate schedules for the upgrades to the ESPC at the NSOF to accommodate a change in the interface to the JPSS Ground System.

The Contractor **shall** support planning, preparation, execution, anomaly resolution, and evaluation as directed by the Government.

### 3.2 Requirements and Specification

The Contractor **shall** perform systems analyses and systems engineering to derive lower-level requirements and design specifications for a design that meets all NESDIS CBU requirements, including interface requirements.

The Contractor **shall** show, as part of the Requirements Review, that all NESDIS CBU requirements have been logically and fully allocated and that all allocated requirements are verifiable.

The Contractor **shall** show, as part of NESDIS CBU PDR and CDR, that all NESDIS CBU requirements are traceable to the design and that the design will meet NESDIS CBU functional, performance, and interface requirements.

The Contractor **shall** work with OSPO to define and document the operational and technical interfaces between the NSOF and the NESDIS CBU for JPSS-related normal and backup ESPC operations.

The Contractor **shall** document all interfaces through an Interface Requirements Specification (IRS) [SE5] and an Interface Control Document (ICD) [SE6].

The Contractor **shall** utilize open protocols when defining new interfaces wherever it is practical and reasonable.

The Contractor **shall** favor reuse when defining new interfaces wherever it is practical and reasonable.

The Contractor **shall** perform analyses and trade studies, including the associated risk assessment and life cycle cost implications, to define and develop the capabilities to satisfy the NESDIS CBU requirements.

The Contractor **shall** document all analyses and trade studies in Study and Analysis Reports [SE 16].

The Contractor **shall** deliver all requirements in an appropriate Requirements Specification [SE 4].

### 3.3 Integration and Test

The Contractor **shall** implement an integration, test, and verification program that verifies compliance with all NESDIS CBU functional, performance, and interface requirements.

The Contractor **shall** ensure NESDIS CBU readiness for interface testing with the JPSS Ground System as defined in Table 1.

The Contractor **shall** support NESDIS CBU interface testing to include test plan and procedure development, test execution support, anomaly identification and resolution, and test reports development as directed by the Government.

The Contractor **shall** identify, develop, and manage the configuration of test data sets used to verify NESDIS CBU performance requirements, including test data that represent worst-case system loading scenarios.

The Government will conduct acceptance tests on the delivered NESDIS CBU. Final Government acceptance of any NESDIS CBU capability will be determined through a System Acceptance Review (SAR).

The Contractor **shall** document their test plans and procedures in the Software Test Plan [SW 6], the Detailed Test Plans and Procedures [IT 2] and in updates to the enterprise Integration and Test Plan [IT 1].

The Contractor **shall** support Government representatives as they independently re-compile and re-execute NESDIS CBU acceptance tests.

The Contractor **shall** document the results of all tests in Post-Test Data Analysis Reports [IT 3] and Post-Test Data Packages [IT4].

### 3.4 Verification

The Contractor **shall** document, in the ESPDS Verification & Validation Plan [SE 8], the overall approach, activities, and plans to verify and validate all NESDIS CBU functional, performance, and interface requirements.

The Contractor **shall** deliver Performance Verification Reports [SE 9] that address the results of all NESDIS CBU requirements verification activities during factory testing and CBU Facility/operations testing.

The Contractor **shall** produce a Performance Verification Matrix [SE 10] for the NESDIS CBU that includes the NESDIS CBU requirements, all interface requirements, and all derived requirements.

### 3.5 Modeling and Simulation

The Contractor **shall** identify NESDIS CBU related inputs to the ESPDS Modeling and Simulation Plan [SE 11].

The Contractor **shall** perform modeling and simulation of NESDIS CBU capabilities to support design, development, integration and testing.

The Contractor **shall** utilize modeling and simulation to ensure compliance with RMA requirements.

The Contractor **shall** document early RMA assumptions and model results in a RMA Predictions Report [QA 2].

The Contractor **shall** utilize modeling and simulation to determine the optimal size for NESDIS CBU routing and enterprise services.

The Contractor **shall** submit Modeling and Simulation Analysis Reports [SE 12] documenting the results of NESDIS CBU modeling and simulation analysis activities.

## 4 Development and Implementation

The Contractor **shall** deploy a PDA/ADRS and NDE COOP systems at the CBU facility as defined in the PDA SRD, the ADRS SRD, the PDA/ADRS deltas in the CBU SRD and the NDE 2.0 SRD.

The Contractor **shall** ensure the design of the NDE and PDA systems at the CBU Facility are synchronized with the NDE and PDA systems at the NSOF; e.g., operational upgrades made to the NSOF system are likewise made to the PDA system at the CBU.

The Contractor **shall** identify for purchase, all items required to implement the NESDIS CBU. The identification of each item shall include the manufacturer's part number, the part name, the quantity required, the required date of delivery, and the place of delivery. The identification shall be in Microsoft Excel format and delivered not later than five (5) days after award of this Work Assignment.

The Contractor **shall** accept delivery of, install and configure all items required to implement the NESDIS CBU.

The Contractor **shall** create any programs, scripts, configuration files, and databases needed to implement the solution that cannot be purchased or are not provided by OSD.

The Contractor **shall** minimize support requirements. This could include allowing for spare parts to be kept on site instead of a 4 hour service contract, use of service contracts on certain hardware, and use of software updates and telephone tech support.

The Contractor **shall** design, develop, and deliver a NESDIS CBU systems, capabilities, and services in accordance with the NESDIS CBU SRD.

The Contractor **shall** describe hardware, software, design, analyses, validation, integration, testing, verification, installation, transition, and operations support associated with NESDIS CBU capabilities, as appropriate for each level of ESPDS review.

The Contractor **shall** identify when and where NESDIS CBU capabilities are part of any ESPDS Software Delivery Package.

The Contractor **shall** identify NESDIS CBU design details within a Design Description [SE 13].

The Contractor **shall** identify any NESDIS CBU database design in a Database Design Description [SE 14].

The Contractor **shall** document detailed software design information in a Software Design Description [SW 5].

The Contractor **shall** document hardware designs and layouts and software locations within an Engineering Drawings and Change Notices [SE 15] document.

The Contractor **shall** document any hardware customization in a Hardware COTS Modification Report [HW 1].

## **5 Delivery and Transition**

The Contractor **shall** plan for the installation of the NESDIS CBU at the CBU Facility and document the plans in a Hardware Installation Plan [HW 2].

The Contractor **shall** study and document lifecycle operations costs in a Sustainment, Maintenance, and Lifecycle Cost Predications Report [TO11].

The Contractor **shall** document all necessary version and configuration information for the NESDIS CBU within a Software Version Description [SW 4].

The Contractor **shall** generate a Software Release Delivery Package [SW 3] for each release of the NESDIS CBU or major segment.

The Contractor **shall** plan for, and assist the Government with, the transition of the NESDIS CBU into operations.

The Contractor **shall** generate User Outreach Material [TO 5] as requested by the Government to help inform end system users about upcoming changes.

The Contractor **shall** conduct training in accordance with the Training Plan [TO 6] and provide Training Documentation [TO 7].

The contractor **shall** document the usage of the system in an Operations Handbook [TO 1], including COOP activation and deactivation and remote operations from the NSOF.



The Contractor **shall** deliver Computer Operations Manuals [TO 3] for all computer hardware that is utilized as part of the NESDIS CBU solution.

The Contractor **shall** deliver Computer Training Manuals [TO 4] for newly developed computers, special-purpose computers, or other computers utilized as part of the NESDIS CBU solution for which commercial or other programming manuals are not readily available.

## **6 Travel**

The Contractor **shall** travel to the CBU facility to install, test, and provide training. Approved contractor travel to the CBU facility must be coordinated with the NOAA Office of the Chief Information Officer (CIO) to provide access and resources.

## **7 Quality Assurance**

### **7.1 Product Assurance**

The Contractor **shall** prepare, submit, and implement any NESDIS CBU-related updates to the ESPDS Quality Assurance Implementation Plan [QA 1].

### **7.2 Anomaly Reporting and Resolution**

The Contractor **shall** capture, track, report status, and document resolution of NESDIS CBU related anomalies, non-conformances, and test failures.

The Contractor **shall** identify any NESDIS CBU anomalies and incidents as such within the anomaly reporting tool.

The Contractor **shall** resolve anomalies, non-conformances, and test failures identified and assigned to the contractor, based on Government-designated priority, through Government acceptance of NESDIS CBU capabilities and Acceptance Reviews.

The Contractor **shall** resolve Severity 1 (critical) and 2 (urgent) anomalies assigned to the Contractor prior to all NESDIS CBU readiness and acceptance reviews.

The Contractor **shall** complete all failure analyses on a unit or module that is critical to the performance of NESDIS CBU, including failure mode, root cause analysis, and recommended corrective actions, within 30 days of failure detection.

## **8 Security Compliance**

System security is of utmost concern to NOAA. In addition to the IT requirements stated in the applicable documents), the Contractor **shall** apply and ensure that all implemented systems and contractor efforts are in total compliance with Federal, DOC, NOAA, NESDIS and OSPO security requirements, including but not limited to, Information Technology (IT) communication security requirements, for all functions both automated and manual. For reference use and applicable policies and procedures check the NESDIS IT Security Handbook web page at: [https://intranet.nesdis.noaa.gov/ocio/it\\_security/handbook/it\\_security\\_handbook.php](https://intranet.nesdis.noaa.gov/ocio/it_security/handbook/it_security_handbook.php).

This web site is a one-stop location for access to all NESDIS, DOC, NOAA, and NIST policies, procedures, and requirements and will be available to the Contractor upon request after contract award.

Security functional requirements/specifications. The Contractor **shall** build specific security controls—as specified by the Government and based on the recommendations of the most recent revision of NIST SP 800-53, Recommended Security Controls for Federal Information Systems and Organizations—into the system/component at the level required by the system’s FIPS 199 security categorization, which is determined by the Government to be High.

- Applicable security controls are documented in the CBU SRD.

The Contractor **shall** update the ESPDS Enterprise Development Subsystem Security Plan [IS 1] to include security impacts of the NESDIS CBU.

The Contractor **shall** assist the Government in identifying required updates to the ESPC System Security Plan.

The Contractor **shall** generate a Security Scan Report [IS 5] to report vulnerabilities and mitigations prior to delivering a system to a Government site.

The Contractor **shall** generate a Security Authorization Input Package [IS 4] to assist the ESPC ISSO in finalizing IATT and ATO documentation.

The Contractor **shall** update the Enterprise E-Authentication Package [IS 2] and Privacy Threshold Analysis/Privacy Impact Assessment [IS 3] as necessary to address security impacts of the NESDIS CBU.

Developmental and evaluation-related assurance requirements. The Contractor **shall** follow security engineering principles (including secure coding practices and code review for software development) consistent with NIST SP 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), to follow a configuration management process in accordance with NIST SP 800-128, Guide for Security-Focused Configuration Management of Information Systems, and to perform security testing and evaluation before delivery to the government.

The Contractor **shall** implement a verifiable flaw remediation process to correct weaknesses and deficiencies identified during the security testing and evaluation process.

Use of Tested, Evaluated, and Validated Products: The Contractor **shall**, to the extent technically possible, incorporate products that have been tested, evaluated, and validated by the government. NIST SP 800-23, Guidelines to Federal Organizations on Security Assurance and Acquisition/Use of Tested/Evaluated Products, provides guidance on the acquisition and use of tested/evaluated information technology products. NIST SP 800-36, Guide to Selecting

Information Technology Security Products, provides guidance on the selection of information security products.

The Contractor **shall** comply with the IT Security requirements of the Department of Commerce as outlined in Commerce Acquisition Regulation (CAR) 1352.239-72, Security Requirements For Information Technology Resources (April 2010), with the exception that the development of a Security Accreditation Package in accordance with CAR 1352.239-72, section (i), is not required.

In addition the Contractor **shall** screen personnel in accordance with the requirements for High Risk contracts as specified by CAM 1337.70 section 2.2; specifically, in accordance with CAR 1352.237-70, Security Processing Requirements—High or Moderate Risk Contracts (April 2010). Any access by contract personnel who are Foreign Nationals shall be in accordance with the requirements of CAR 1352.237-73, Foreign National Visitor and Guest Access to Departmental Resources (APR 2010).

The Contractor **shall** utilize hardware that is capable of being configured to utilize PIV-compliant smart card authentication in accordance with HSPD-12. Specifically, in order to comply with FIPS PUB 201, agencies are required to purchase only approved personal identity verification products and services. (b) Agencies may acquire the approved products and services from the GSA, Federal Supply Schedule 70, Special Item Number (SIN) 132-62, HSPD-12 Product and Service Components, in accordance with ordering procedures outlined in FAR Subpart 8.4.

The Contractor **shall** utilize hardware that is Internet Protocol Version 6 (IPv6) capable. Specifically, IPv6 requirements from FAR part 11.002 (g) are hereby incorporated, specifically: This requirements specification document requires compliance with the technical capabilities defined in the USGv6 Profile (NIST Special Publication 800-119) and the corresponding declarations of conformance defined in the USGv6 Test Program (see also OMB Memorandum M-05-22 dated August 2, 2005).

## APPENDIX A: Applicable and Reference Documents

Applicable documents are Government-prepared and controlled documents and industry standards documents.

### A.1 Applicable Documents

DOCUMENT ID	TITLE	AVAILABLE LOCATION	REVISION	DATE
TBS	Consolidated Back-Up System Requirements Document	ESPDS PMO	Latest	Latest
OSD-ESPDS-SRD-R18-001	Product Distribution and Access System Requirements Document	ESPDS PMO	Latest	Latest
	Ancillary Data Relay System Requirements Document	ESPDS PMO	Latest	Latest
TBS	National Polar-orbiting Partnership Data Exploitation 2.0 System Requirements Document	ESPDS PMO	Latest	Latest
212-1300	NOAA IT Security Manual		4.2	March 31, 2008
474-00303	Joint Polar Satellite System (JPSS) Ground System (GS) to National Environmental Satellite, Data, and Information Service (NESDIS) Environmental Satellite Processing Center (ESPC) Interface Requirements Document (IRD)	ESPDS PMO	TBD	TBD
NPR 7123	NASA Systems Engineering Processes and Requirements	<a href="http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&amp;c=7123&amp;s=1A">http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&amp;c=7123&amp;s=1A</a>	1A	March 26, 2007
NIST 800-37	Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach	<a href="http://csrc.nist.gov/publications/nistpubs/800-18-Rev1/sp800-18-Rev1-final.pdf">http://csrc.nist.gov/publications/nistpubs/800-18-Rev1/sp800-18-Rev1-final.pdf</a>	Rev 1	02/2010
NIST 800-60	Guide for Mapping Types of Information and Information Systems to Security Categories.	<a href="http://csrc.nist.gov/publications/nistpubs/index.html">http://csrc.nist.gov/publications/nistpubs/index.html</a>	Rev 1	08/2008
	U.S. Department of Commerce, IT Security Program Policy and Commerce Interim Technical Requirements	<a href="http://www.osec.doc.gov/cio/ITSIT/DOC-IT-Security-Program-Policy.htm">http://www.osec.doc.gov/cio/ITSIT/DOC-IT-Security-Program-Policy.htm</a>	Final	01/2009
	NOAA NESDIS Office of Satellite Operations, IT Management User Guide	G:\OSO\C&A Activities\OSO Policies and Procedures	Final	03/11/2008
	NOAA IT Security Web page	<a href="https://www.csp.noaa.gov/policies/index.html">https://www.csp.noaa.gov/policies/index.html</a>	Updated	12/18/2008
NIST FIPS 199	NIST FIPS 199, Standards for Security Categorization of Federal Information and Information Systems	<a href="http://csrc.nist.gov/publications/fips/fips199/FIPS-PUB-199-final.pdf">http://csrc.nist.gov/publications/fips/fips199/FIPS-PUB-199-final.pdf</a>	Final	02/2004
NIST 800-53	Recommended Security Controls for Federal Information Systems and Organizations	<a href="http://csrc.nist.gov/publications/nistpubs/index.html">http://csrc.nist.gov/publications/nistpubs/index.html</a>	Rev 3	05/2010

DOCUMENT ID	TITLE	AVAILABLE LOCATION	REVISION	DATE
NIST 800-34	Contingency Planning Guide for Information Technology Systems	<a href="http://csrc.nist.gov/publications/nistpubs/index.html">http://csrc.nist.gov/publications/nistpubs/index.html</a>	Rev 1	11/2010
OMB Circular A-130	Security of Federal Automated Information Resources, Appendix III	<a href="http://www.whitehouse.gov/omb/circulars_a130_a130appendix_iii">http://www.whitehouse.gov/omb/circulars_a130_a130appendix_iii</a>	Revised	11/2000
	Federal Information Security Management Act (FISMA)	<a href="http://csrc.nist.gov/drivers/documents/FISMA-final.pdf">http://csrc.nist.gov/drivers/documents/FISMA-final.pdf</a>	Final	2002
ANSI-748	ANSI-748 Intent Guide	<a href="http://www.ndia.org/divisions/divisions/procurement/documents/pmscommittee/committeedocuments/complementsansi/ndia_pmsc_intent_guide_may_2011.pdf">http://www.ndia.org/divisions/divisions/procurement/documents/pmscommittee/committeedocuments/complementsansi/ndia_pmsc_intent_guide_may_2011.pdf</a>	Final	05/2011
	NESDIS IT Security Policies and Procedures	<a href="https://intranet.nesdis.noaa.gov/ocio/it_security/handbook/it_security_handbook.php">https://intranet.nesdis.noaa.gov/ocio/it_security/handbook/it_security_handbook.php</a>	Updated	05/01/2011
NIST SP 800-128	Guide for Security-Focused Configuration Management of Information Systems	<a href="http://csrc.nist.gov/publications/nistpubs/800-128/sp800-128.pdf">http://csrc.nist.gov/publications/nistpubs/800-128/sp800-128.pdf</a>	Final	August 2011

## A.2 Reference Documents

Reference documents amplify or clarify information presented in the document.

DOCUMENT ID	TITLE	REVISION	DATE	SOURCE LOCATION

**APPENDIX B: Applicable CDRL Deliverables**

<b>ID</b>	<b>Title</b>	<b>Applicability Level</b>	<b>Task Order Submission</b>
PM 1	Project Management Plan (PMP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 2	Integrated Master Plan (IMP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 5	Meeting Minutes	Work Assignment	Final: Meeting + 1 week Updates: As required
PM 6	Task Order and Work Assignment Closure Plans	ESPDS Enterprise and Work Assignments	Initial: Task Order or WA Completion - 90 days Final: Task Order or WA Completion - 30 days
PM 7	Integrated Master Schedule	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 8	Status Reports	ESPDS Enterprise and Work Assignments	As required in accordance with the ESPDS CDRL
PM 9	Project Management Status Review (PMSR) Data Package	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 10	Integrated Baseline Review (IBR) Data Package	ESPDS Enterprise	Final: IBR – 1 week Updates: As required for baseline changes and updates
PM 11	Earned Value Management System (EVMS) Plan	ESPDS Enterprise	Final: IBR – 1 week Updates: Annually by August 1st
PM 12	Contract Performance Report (CPR)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 13	Personal Property Management Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 14	Personal Property Inventory	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 15	Work Breakdown Structure (WBS)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
FM 1	Contract Funds Status Report	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 1	Document Tree	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 3	Specification Tree	ESPDS Enterprise	As required in accordance with the ESPDS CDRL

<b>ID</b>	<b>Title</b>	<b>Applicability Level</b>	<b>Task Order Submission</b>
CC 4	Change Requests (CR)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 5	Configuration Item Identification List	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 6	Configuration Item Control Board Documentation	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 7	Engineering Deviations and Waivers	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 8	Configuration Management Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 9	Anomaly Tracking List	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
IS 1	System Security Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
IS 2	E-Authentication Package	ESPDS Enterprise	Initial: PDR – 1 week Final: WA Completion – 1 week Updates: As required by the DID
IS 3	Privacy Threshold Analysis/ Privacy Impact Assessment	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
IS 4	Security Authorization Inputs	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SE 1	Systems Engineering Management Plan (SEMP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SE 2	‘To Be’ Architecture	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SE 3	Operations Concept	ESPDS Enterprise	Initial: PDR – 1 week Final: CDR – 1 week Updates: Initial CDR – 3 weeks, every WA SDR, PDR, CDR and as required
SE 4	Requirements Specifications	Work Assignment	Initial: WA SDR – 1 week Final: WA PDR – 1 week Updates: As required
SE 5	Interface Requirements Specification (IRS)	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: WA CDR + 90 days and as required
SE 6	Interface Control Document (ICD)	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR - 1 week Updates: WA CDR + 90 days and as required
SE 8	Verification & Validation Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL

<b>ID</b>	<b>Title</b>	<b>Applicability Level</b>	<b>Task Order Submission</b>
SE 9	Performance Verification Reports	Work Assignment	As required in accordance with the ESPDS CDRL
SE 10	Performance Verification Matrix	Work Assignment	Initial: WA PDR – 1 week Final: WA Operational Readiness Review – 1 week Updates: Each verification activity + 30 days and as required
SE 11	Modeling and Simulation Plan	ESPDS Enterprise	Initial: WA SDR – 1 week Final: WA CDR – 1 week Updates: CDR + 90 days and as required
SE 12	Modeling and Simulation Analysis Report	Work Assignment	As required in accordance with the ESPDS CDRL
SE 13	Design Description	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: CDR + 90 days and as required
SE 14	Database Design Description	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: CDR + 90 days and as required
SE 15	Engineering Drawings and Change Notices	Work Assignment	Initial: WA CDR – 1 week Final: 1 week prior to WA PSR(s) Updates: As required
SE 16	Study and Analysis Reports	Work Assignment	As required in accordance with the ESPDS CDRL
RE 1	Test Readiness Review Package	Work Assignment	Final: 1 week prior to testing Updates: 1 week prior to each test
RE 2	Pre-Ship Review (PSR) Packages	Work Assignment	Final: 1 week prior to WA PSR
RE 4	System Requirements Review (SRR)/ System Definition Review (SDR) Packages	Work Assignment	Initial: WA SRR/SDR – 1 week Final: WA SRR/SDR + 30 days
RE 5	Preliminary Design Review (PDR) Packages	Work Assignment	Initial: WA PDR – 1 week Final: WA PDR + 30 days
RE 6	Critical Design Review (CDR) Packages	Work Assignment	Initial: WA CDR – 1 week Final: WA CDR + 30 days
RE 7	Operational Readiness Review (ORR) Packages	Work Assignment	Initial: WA ORR – 1 week Final: WA ORR + 30 days
RE 8	Systems Acceptance Review (SAR) Packages	Work Assignment	Initial: WA SAR – 1 week Final: WA SAR + 30 days



<b>ID</b>	<b>Title</b>	<b>Applicability Level</b>	<b>Task Order Submission</b>
HW 1	Hardware COTS Modification Report	Work Assignment	As required in accordance with the ESPDS CDRL
HW 2	Hardware Installation Plan	Work Assignment	Final: WA PSR – 1 week Updates: As required
SW 1	Software Management and Development Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SW 2	Software COTS Modification Report	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SW 3	Software Release Delivery Package	Work Assignment	As required in accordance with the ESPDS CDRL
SW 4	Software Version Description	Work Assignment	Initial: TRR – 1 week Final: For each WA Updates: 1 week prior to each test and as required
SW 5	Software Design Document	Work Assignment	Initial: TRR – 1 week Final: WA Completion – 1 week Updates: As required
SW 6	Software Test Plan	Work Assignment	Initial: PDR – 1 week Final: CDR – 1 week Updates: As required
SW 7	Software User Manual(s)	Work Assignment	Initial: TRR – 1 week Final: WA Completion – 1 week Updates: As required
IT 1	Integration and Test Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
IT 2	Detailed Test Plan(s) and Procedures	Work Assignment	Initial: 1 week prior to test Final: TRR/Test – 1 week Updates: As required
IT 3	Post-Test Data Analysis Report	Work Assignment	As required in accordance with the ESPDS CDRL
IT 4	Post-Test Data Packages	Work Assignment	As required in accordance with the ESPDS CDRL
TO 1	Operations and Maintenance Manual	Work Assignment	As required in accordance with the ESPDS CDRL
TO 3	Computer Operations Manuals	Work Assignment	As required in accordance with the ESPDS CDRL
TO 4	Computer Programming Manuals	Work Assignment	Initial: WA Final Factory TRR – 1 week Final: WA Completion – 1 week Updates: As required for each WA

<b>ID</b>	<b>Title</b>	<b>Applicability Level</b>	<b>Task Order Submission</b>
TO 5	User Training, Education, and Outreach Material(s)	Work Assignment	Initial: WA Final TRR – 1 week Final: WA Training Execution – 1 week Updates: As required for each WA
TO 6	Training Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 7	Training Documentation	Work Assignment	Initial: WA Final TRR – 1 week Final: WA Training Execution – 1 week Updates: As required for each WA
TO 8	Maintenance Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 9	Maintenance Records	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 10	Facilities Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 11	Sustainment, Maintenance, and Lifecycle Cost Predications Report	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
QA 1	Quality Assurance Implementation Plan (QAIP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
QA 2	Reliability, Maintainability, and Availability (RMA) Predictions Report	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: As required

## APPENDIX C: Acronyms

AD	Applicable Document
CBU	Consolidated Backup
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CIP	Critical Infrastructure Project
DID	Data Item Description
DNS	Domain Name System
ESPC	Environmental Satellite Processing Center
ESPDS	Electronic Satellite Processing Distribution System
FIPS	Federal Processing Information Standards
ICD	Interface Control Document
IRS	Interface Requirements Specification
LAN	Local Area Network
LDAP	Lightweight Directory Access Protocol
NDE	SNPP Data Exploitation
NESDIS	National Environmental Satellite, Data, and Information Service
NIST	National Institute of Science and Technology
NOAA	National Oceanic and Atmospheric Administration
NSOF	NOAA Satellite Operations Facility
OSDPD	Office of Satellite Data Processing and Distribution
OSO	Office of Satellite Operations
OSPO	Office of Satellite & Product Operations
PDA	Product Distribution and Access
SNPP	Suomi National Polar-orbiting Partnership
SOW	Statement of Work
SRR	System Requirements Review
TBC	To Be Confirmed
TBS	To Be Supplied
TRR	Test Readiness Review
WA	Work Assignment

**FAR 52.243-2 CHANGES – Cost Reimbursement Alternate I (APR 1984)**

**WORK ASSIGNMENT 2 – NPOESS DATA EXPLOITATION (NDE)  
Supplemental Changes - May 16, 2013**

Changes are required to Work Assignment 2 – NPOESS Data Exploitation (NDE) as set forth herein.

**CHANGE 1:**

The contractor shall provide sustainment support on a twenty-four (24) hours per day, seven (7) days per week, strictly on-call basis with two (2) hour response time to NDE systems that ingest, process and distribute operational satellite products. This change will support a NOAA requirement to make NPP satellite products available to users on an operational basis prior to the transition of NDE operational system responsibilities to OSPO in 2013. The Environmental Satellite Processing Center (ESPC) Help Desk will receive technical support from the contractor to resolve NDE system anomalies. Start Date: Specified in the Modification/Supplemental Agreement resulting from this Change Order. Assume an August 20, 2012 start date for estimating the cost/price of performance. End Date: April 30, 2013.

Change 1.1: End Date: January 31, 2014

**CHANGE 2:**

The contractor shall deliver NDE system documentation complying with the Documentation Standard Guidelines approved by the NESDIS Satellite Products and Services Review Board (SPSRB). The documentation format shall be online via a collaboration tool provided by the Government. Start Date: Specified in the Modification/Supplemental Agreement resulting from this Change Order. End date: Specify in Request for Equitable Adjustment for inclusion in the Modification/Supplemental Agreement resulting from this Change Order.

Change 2.1: No changes. Work is complete.

**Applicable Documents:**

- [REDACTED]
- [REDACTED] b(4) [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

**CHANGE 3:**

The contractor shall specify, install, integrate, test, and transition to OSPO a second NDE operational processing system. Start Date: End date: Not later than February 28, 2013.

Change 3.1: The Contractor shall configure, integrate, test and transition to OSPO hardware and software enhancements required to support software algorithms running on the **b(4)** platform. The contractor shall complete Build 4 – Inclusion of Product Definition, Ingest, Production Generation, and Distribution GUIs. Contractor shall conduct regression testing of NDE Build 5, and integration and testing of NDE Build 5, Phase 2. End Date: December 31, 2013.

**CHANGE 4:**

The contractor shall work with environmental satellite product algorithm developers to integrate Delivered Algorithm Packages (DAPs) with the NDE Data Handling System (DHS), develop production rules for tailoring products, and assist with evaluation and testing of products. (This Change results from an increase in government requirements). Start Date: Specified in the Modification/Supplemental Agreement resulting from this Change Order. End date: August 31, 2013.

Change 4.1: No changes, work in progress.

**CHANGE 5:**

The contractor shall perform specification, acquisition, installation, and configuration of compute, storage, and network equipment in Development, Test, and Production Environments. The contractor shall perform acquisition, installation, configuration, and administration of Oracle RAC in System Test and Production environments. End date: December 31, 2013.

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 026		3.EFFECTIVE DATE 07/18/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 04/04/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 43.103(a)(3) Supplemental Agreement</b>				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:07/17/2013		Quote Dated:07/17/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification: (1) Adds Work Assignment (WA) 11 - Consolidated Back Up (CBU). Reference CBU Task Statement v1.0 and System Requirements Document Version 1.0 and the contractor's cost estimate and technical proposal dated June 21, 2013;				

- (2) Modifies WA2 - NDE. Reference WORK ASSIGNMENT 2 4 NPOESS DATA EXPLOITATION (NDE) Supplemental Changes - May 16, 2013 and the contractor's request for equitable adjustment (cost estimate and technical response) dated June 19, 2013;
- (3) Increases the value of the Task Order by the estimated cost of performing WA11 for the current contract performance period and the request for equitable adjustment as set forth on the attached continuation page; and
- (4) Makes complete equitable adjustment (is a Supplemental Agreement) for the changes to the Task Order resulting from this modification.

**FOR INQUIRIES REGARDING PAYMENT CONTACT:**

GSA Finance Customer Support 816-926-7287

PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR b(6)	15C. DATE SIGNED 07/18/2013	16B. UNITED STATES OF AMERICA Anthony W Pellegrino	16C. DATE SIGNED 07/18/2013
(Signature of person authorized to sign)		(Signature of person authorized to sign)	
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 027		3.EFFECTIVE DATE 07/30/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)			9A. AMENDMENT OF SOLICITATION NO.	
			9B. DATED (SEE ITEM 11)	
			10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change	
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 07/18/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>52.232-22 Limitation of Funds</b>				
<b>E. IMPORTANT:</b> Contractor IS NOT required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:07/29/2013		Proposal Dated:07/29/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification allots funds to the contract in accordance with FAR 52.232-22. See the attached continuation pages for the amount allotted to the contract. FOR INQUIRIES REGARDING PAYMENT CONTACT:				



GSA Finance Customer Support 816-926-7287			
PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 07/30/2013
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	



# **Environmental Satellite Processing and Distribution System (ESPDS) Development**

## **Work Assignment 12: National Environment Satellite, Data, and Information Service (NESDIS) National Polar-orbiting Partnership Data Exploitation 2.0 (NDE 2.0)**

**Version 1.1**

**May 29, 2013**



U.S. Department of Commerce (DOC)  
National Oceanic and Atmospheric Administration (NOAA)  
National Environmental Satellite, Data, and Information Service (NESDIS)

## CHANGE RECORD

[illegible]

The document version number identifies whether the document is a working copy, final, revision, or update, defined as follows:

- **Working copy or Draft:** a document not yet finalized or ready for distribution; sometimes called a draft. Use 0.1A, 0.1B, etc. for unpublished documents.
- **Final:** the first definitive edition of the document. The final is always identified as Version 1.0.
- **Revision:** an edition with minor changes from the previous edition, defined as changes affecting fewer than one-third of the pages in the document. The version numbers for revisions 1.1 through 1.9, 2.1 through 2.9, and so forth. After nine revisions, any other changes to the document are considered an update. A revision in draft, i.e. before being re-baselined, should be numbered as 1.1A, 1.1B, etc.

- **Update:** an edition with major changes from the previous edition, defined as changes affecting more than one-third of the pages in the document. The version number for an update is always a whole number (Version 2.0, 3.0, 4.0, and so forth).

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# 1 Introduction

The current legacy series National Oceanic and Atmospheric Administration (NOAA) Polar-orbiting Operational Environment Satellite (POES) will be replaced by the next generation series of environmental monitoring satellites acquired through the Joint Polar Satellite System (JPSS) Program Office. Suomi National Polar-orbiting Partnership (S-NPP), a NASA satellite launched in October 2011, will be a bridge mission from NOAA's current series of polar-orbiting satellites to JPSS. Command and control for S-NPP and processing of S-NPP data products is provided by the NOAA JPSS Ground System. Although S-NPP is designated a Risk Reduction mission, NOAA is 'operationalizing' the products derived from S-NPP sensors to ensure continuity of the National Environmental Satellite, Data, and Information Service (NESDIS) polar mission. The follow-on JPSS satellites have been designated JPSS-1 and JPSS-2; they are planned to have sensor capabilities similar to those found on S-NPP.

NPP Data Exploitation (NDE) 1.0, located within the Environmental Satellite Processing Center (ESPC), was developed to provide enhanced environmental observations from S-NPP to NOAA Operational Centers and other civilian customers. NDE 1.0 is the only source of near real-time global environmental products derived from S-NPP sensors dedicated to civilian applications. It is also the only source of S-NPP products tailored for NOAA's requirements, that is NDE Unique Products (NUPs) and Visible Infrared Imaging Radiometer Suite (VIIRS) imagery products. Note: Retrospective S-NPP data (including selected NUPs from NDE 1.0) are available from NOAA's Comprehensive Large Array-data Stewardship System (CLASS).

The NDE 1.0 ingests and verifies integrity of the products delivered by the JPSS Ground System Interface Data Processing System (IDPS) in Hierarchical Data Format 5 (HDF5), tailors NPP products to meet NOAA user requirements (e.g. alternate data formats such as netCDF4, map projections, subsets), generates NUPs from S-NPP products, provides online user services for product and order management, provides system monitoring and reporting services, and stages S-NPP and NDE 1.0 products for distribution to users.

To support the need to process and distribute data from the JPSS satellites and to support NESDIS' move to an enterprise-wide satellite ground processing solution for all NOAA missions, NDE 1.0 is moving the next phase of its development, called NDE 2.0. NDE 2.0 includes augmenting NDE 1.0's information technology (IT) infrastructure and product development efforts to be compliant with NESDIS's enterprise efforts (e.g., use of the Product Distribution and Access (PDA) system for all ESPC product distribution) and to add capability to process and stage products from S-NPP, Global Change Observation Mission – Water (GCOM-W) and JPSS-1 satellites.

This Work Assignment is to design and implement NDE 2.0 at the NOAA Satellite Operations Facility in Suitland, Maryland.

## 1.1 Scope

The scope of the National Environmental Satellite, Data, and Information Service (NESDIS) National Polar-orbiting Partnership (NPP) Data Exploitation (NDE) 2.0 Work Assignment is to:

- Transition the NDE 1.0 hardware and software to entirely x86 based platform, maintaining NDE 1.0 functions and capabilities

- Update the NDE 1.0 system to interface with the Joint Polar Satellite System (JPSS) Block 2.0 Ground System to receive S-NPP, GCOM, and JPSS-1 mission data
- Update the NDE 1.0 system to interface with the ESPC Product Distribution and Access (PDA) system for retrieval of ancillary data and distribution of S-NPP, JPSS-1, and NDE 2.0 products
- Provide system site synchronization; i.e., system parameters (production rules, user and order profiles), but not mission data (Oracle database less data catalog)
- Receive, evaluate, integrate, test, and support deployment of Delivered Algorithm Packages (DAPs) on NDE 1.0 and NDE 2.0
- Incorporate the GCOM Product Distribution System (PDS) functions and implement the Japan Aerospace Exploration Agency (JAXA)-provided software on the NDE 2.0 system
- Support tests with JPSS Ground System, PDA, and external users
- Support the NESDIS Center for Satellite Applications and Research (STAR) with upgrades to the NDE 2.0 system to evaluate Environmental Data Record (EDR) processing for JPSS risk reduction

In addition, the work assignment scope includes performing studies, re-design and upgrades to integrate NDE with NESDIS enterprise systems, including:

- Support for NESDIS common (shared) storage;
- Capability to support enterprise environmental satellite product generation;
- Installation of DAPs via ESPC Red Hat Satellite Server (i.e., as RPM packages);
- Common Enterprise Service Bus for system messaging.

Collectively this scope will be referred to as ‘NDE 2.0’ in this Work Assignment.

The scope of this effort also includes continued support for DAP installation, integration (e.g. development of production rules), and testing on NDE 1.0 and 2.0. This work requires coordination with STAR algorithm developers and OSPO Product Area Leads (PALs).

The scope of this effort does not include deployment of a continuity of operations (COOP) system at the Consolidated Back Up (CBU) facility. It also does not include development of new and enhanced satellite products from S-NPP and JPSS satellite sensors or development of blended (i.e., multi-satellite) products.

## 1.2 Terminology

The term “shall” designates a requirement. The terms “will” and “is” designate statements of fact.

The term TBS means “to be supplied” by the Government, and its use identifies missing or incomplete information, values, or data needed to fulfill a requirement.

The term Days means, unless indicated otherwise, calendar days.

The terms KTR and K mean the development contractor.

The terms Gov, Govt, and G mean the Government.

### 1.3 Applicable and Reference Documents

The WA Applicable and Reference Documents Lists are supplied as Appendix A, listing each of the documents and information sources that are relevant to this WA. Applicable documents typically are Government-prepared and controlled documents and industry standards documents. Reference documents are intended to amplify or clarify the information or requirements presented in a document.

The applicable documents cited within this WA form a part of the WA as specified.

### 1.4 Delivery Dates

The NDE 2.0 development effort shall be completed in order to meet the critical events as defined in Table 1. Development work can continue beyond the current contract Option Period two subject to the exercise of contract Option Periods.

## 2 Technical Management

As part of the Post-Award Conference, the Contractor **shall** perform a line-by-line review of the development schedule, the requirements, and the documents identified as Applicable documents in Appendix A.

The Contractor **shall** define and schedule the NDE 2.0 milestones and activities that will be completed as part of this Work Assignment, including the critical events listed in Table 1, and all other related reviews and technical meetings, integration and test events, and capability readiness dates.

The Contractor **shall** adjust plans, schedules and resources as a result of Government controlled changes in critical event milestones.

**Table 1 NDE 2.0 Critical Events (TBR)**

<b>Event</b>	<b>Date Establishment (Planned)</b>	<b>Date Control</b>
ESPDS NDE 2.0 WA Award	3 June 2013	Govt
ESPDS NDE 2.0 dSRR/dSDR	13 August 2013	Govt
ESPDS NDE 2.0 dCDR	17 December 2013	Govt
NDE 2.0 Readiness for Initial JPSS Testing at NSOF	2 June 2014	Govt
System Acceptance Review (SAR)	29 May 2015	Govt
JPSS Ground Segment Operational Readiness Review (ORR) [Support role]	24 December 2015	Govt

The Contractor **shall** incorporate milestones and activities into the ESPDS Integrated Master Plan [PM 2] and ESPDS Integrated Master Schedule [PM 7].

The Contractor **shall** identify action items within the ESPDS Master Action Item Database.



The Contractor **shall** make any necessary updates to the Configuration Management Plan [CC 8] to ensure the plan addresses the additional site and compliance with applicable NIST 800-53 CM controls.

The Contractor Configuration Control Board (CCB) **shall** include Government participation in the review and approval of changes to hardware, software, and documentation.

### **3 System Engineering and Integration**

The Contractor **shall** perform all NDE 2.0 systems engineering and integration functions that are necessary for the requirements development, definition, design, integration, and testing of all requirements, as specified in the NDE 2.0 System Requirements Document.

The Contractor **shall** conduct formal reviews, including the Initial Baseline Review (IBR), delta System Requirements Review/delta System Design Review (dSRR/dSDR) [RE 4], Critical Design Review (CDR) [RE 6], Test Readiness Reviews (TRRs) [RE 1], Pre-Ship Review (PSR) [RE 2], Operational Readiness Reviews (ORR) [RE 7], and System Acceptance Reviews (SAR) [RE 8] with content, entrance criteria, and exit criteria as defined by the ESPDS Systems Engineering Management Plan and NASA NPR 7123.

The Government **will** utilize a JPSS provided NASA Integrated Independent Review Team (IIRT) in support of dSRR/dSDR, and dCDR events.

The Contractor **shall** designate a NDE 2.0 systems engineer to conduct and coordinate day-to-day systems engineering activities related to NDE 2.0 development, and to act as the technical interface to the Government.

The Contractor **shall** provide all ESPDS Enterprise deliverables; as applicable, additional guidance is provided in this Work Assignment for specific documents.

The Contractor **shall** ensure that the ESPDS Operations Concept [SE 3] is updated to describe NDE 2.0 operations.

The Contractor **shall** update the Enterprise ‘To Be’ Architecture [SE 2] to include any architectural impacts of NDE 2.0.

The Contractor **shall** update the Sustainment, Maintenance, and Lifecycle Cost Predictions Report [TO 11] to include any impacts of NDE 2.0.

The Contractor **shall** leverage existing ESPDS infrastructure and enterprise capabilities wherever practical and reasonable.

#### **3.1 Work Assignment Coordination**

The Contractor **shall** provide access for representatives authorized by the Government, to attend reviews, to access data and documentation on the Contractor information-sharing portal, and to participate in technical interchange meetings.

The Contractor **shall** provide technical support and resources, as directed by the Government, to participate in Integrated Project Teams (IPTs) and other technical interchange meetings and working groups.

The Contractor **shall** provide technical support and resources, as directed by the Government, to participate in and present status at JPSS formal reviews, NOAA JPSS Office (NJO) reviews, and other NESDIS reviews.

The Contractor **shall** work with the Office of Satellite and Product Operations (OSPO) ESPC Operations and Maintenance (O&M) contractor, through the Government, to integrate NDE 2.0 changes into NSOF ESPC operations and maintenance.

The Contractor **shall** work with OSPO ESPC O&M contractor, through the Government, to coordinate schedules for the upgrade to the ESPC at the NSOF to accommodate a change in the interface to the JPSS Ground System.

The Contractor **shall** work with the Center for Satellite Applications and Research (STAR), and NOAA JPSS Office (NJO) staff to support the JPSS EDR Risk Reduction Project.

The Contractor **shall** receive, evaluate, integrate, test, and support deployment to operations of DAPs in coordination with STAR and OSPO staff.

The Contractor **shall** work with the JPSS Ground Project, through the Government, to coordinate test and verification activities to support upgrades to the ESPC at the NSOF.

The Contractor **shall** support tests with the JPSS Ground System, PDA, CBU, (e.g., networks) and external users.

The Contractor **shall** support planning, preparation, execution, anomaly resolution, and evaluation as directed by the Government.

### 3.2 Requirements and Specification

The Contractor **shall** perform systems analyses and systems engineering to derive lower-level requirements and design specifications for a design that meets all NDE 2.0 requirements, including interface requirements.

The Contractor **shall** show, as part of the delta Requirements Review, that all NDE 2.0 requirements have been logically and fully allocated and that all allocated requirements are verifiable.

The Contractor **shall** show, as part of NDE 2.0 dPDR and dCDR, that all NDE 2.0 requirements are traceable to the design and that the design will meet NDE 2.0 functional, performance, and interface requirements.

The Contractor **shall** document all interfaces through an Interface Requirements Specification (IRS) [SE5] and an Interface Control Document (ICD) [SE6].

The Contractor **shall** perform analyses and trade studies, with associated risk assessment and life cycle cost implications, to define and develop the capabilities to satisfy the NDE 2.0 requirements, including:

- Support for NESDIS common (shared) storage;
- Capability to support enterprise environmental satellite product generation;
- Installation of DAPs via ESPC Red Hat Satellite Server (i.e., as RPM packages);
- Common Enterprise Service Bus for system messaging.

The Contractor **shall** perform analyses and trade studies, including the associated risk assessment and life cycle cost implications, to support EDR processing risk reduction activities.

The Contractor **shall** document all analyses and trade studies in Study and Analysis Reports [SE 16].

The Contractor **shall** deliver all requirements in an appropriate Requirements Specification [SE 4].

### 3.3 Integration and Test

The Contractor **shall** implement an integration, test, and verification program that verifies compliance with all NDE 2.0 functional, performance, and interface requirements.

The Contractor **shall** ensure NDE 2.0 readiness for interface testing with the JPSS Ground System as defined in Table 1, NDE 2.0 Critical Events.

The Contractor **shall** support NDE 2.0 interface testing to include test plan and procedure development, test execution support, anomaly identification and resolution, and test reports development as directed by the Government.

The Contractor **shall** identify, develop, and manage the configuration of test data sets used to verify NDE 2.0 performance requirements, including test data that represent worst-case system loading scenarios.

The Government will conduct acceptance tests on the delivered NDE 2.0. Final Government acceptance of any NDE 2.0 capability will be determined through a System Acceptance Review (SAR).

The Contractor **shall** document their test plans and procedures in the Software Test Plan [SW 6], the Detailed Test Plans and Procedures [IT 2] and in updates to the enterprise Integration and Test Plan [IT 1].

The Contractor **shall** support Government representatives as they independently re-compile and re-execute NDE 2.0 acceptance tests.

The Contractor **shall** document the results of all tests in Post-Test Data Analysis Reports [IT 3] and Post-Test Data Packages [IT4].

### 3.4 Verification

The Contractor **shall** document, in the ESPDS Verification & Validation Plan [SE 8], the overall approach, activities, and plans to verify and validate all NDE 2.0 functional, performance, and interface requirements.

The Contractor **shall** deliver Performance Verification Reports [SE 9] that address the results of all NDE 2.0 requirements verification activities during factory testing, onsite testing, and operations testing.

The Contractor **shall** produce a Performance Verification Matrix [SE 10] for NDE 2.0 that includes the NDE 2.0 requirements, all interface requirements, and all derived requirements.

### 3.5 Modeling and Simulation

The Contractor **shall** identify NDE 2.0 related inputs to the ESPDS Modeling and Simulation Plan [SE 11].

The Contractor **shall** perform modeling and simulation of NDE 2.0 capabilities to support design, development, integration and testing.

The Contractor **shall** utilize modeling and simulation to ensure compliance with Reliability, Maintainability, and Availability (RMA) requirements.

The Contractor **shall** document early RMA assumptions and model results in a RMA Predictions Report [QA 2].

The Contractor **shall** submit Modeling and Simulation Analysis Reports [SE 12] documenting the results of NDE 2.0 modeling and simulation analysis activities.

## 4 Development and Implementation

The Government will purchase and deliver all items required to implement NDE 2.0, including the JAXA-provided Government off-the-shelf (GOTS) software.

The Contractor **shall** transition the NDE 1.0 hardware and software to entirely x86 based platform for the NDE 2.0 implementation.

The Contractor **shall** install and configure all items required to implement NDE 2.0.

The Contractor **shall** create any programs, scripts, configuration files, and databases needed to implement the solution that cannot be purchased or are not provided by OSD.

The Contractor **shall** minimize support requirements. This could include allowing for spare parts to be kept on site instead of a 4 hour service contract, use of service contracts on certain hardware, and use of software updates and telephone tech support.

The Contractor **shall** design, develop, and deliver NDE 2.0 systems, capabilities, and services in accordance with the NDE 2.0 SRD.

The Contractor **shall** describe hardware, software, design, analyses, validation, integration, testing, verification, installation, transition, and operations support associated with NDE 2.0 capabilities, as appropriate for each level of ESPDS review.

The Contractor **shall** identify when and where NDE 2.0 capabilities are part of any ESPDS Software Delivery Package.

The Contractor **shall** identify NDE 2.0 design details within a Design Description [SE 13].

The Contractor **shall** identify any NDE 2.0 database design in a Database Design Description [SE 14].

The Contractor **shall** document detailed software design information in a Software Design Description [SW 5].

The Contractor **shall** document hardware designs and layouts and software locations within an Engineering Drawings and Change Notices [SE 15] document.

## **5 Delivery and Transition**

The Contractor **shall** plan for the installation of NDE 2.0 at the NSOF and document the plans in a Hardware Installation Plan [HW 2].

The Contractor **shall** study and document lifecycle operations costs in an Operations, Maintenance and Sustainment Lifecycle Costs Predictions report [TO11].

The Contractor **shall** document all necessary version and configuration information for the NDE 2.0 within a Software Version Description [SW 4].

The Contractor **shall** generate a Software Release Delivery Package [SW 3] for each release of NDE 2.0.

The Contractor **shall** plan for, and assist the Government with, the transition of the NDE 2.0 into operations.

The Contractor **shall** generate User Outreach Material [TO 5] as requested by the Government to help inform end system users about upcoming changes.

The Contractor **shall** conduct training in accordance with the Training Plan [TO 6] and provide Training Documentation [TO 7].

The Contractor **shall** document the usage of the system in an Operations Handbook [TO 1].

The Contractor **shall** deliver Computer Operations Manuals [TO 3] for all computer hardware that is utilized as part of the NDE 2.0 solution.

The Contractor **shall** deliver Computer Training Manuals [TO 4] for newly developed computers, special-purpose computers, or other computers utilized as part of the NDE 2.0 solution for which commercial or other programming manuals are not readily available.

## 6 Travel

The Contractor **shall** perform work at the NSOF to install, test, and provide training. Other travel is not expected for this Work Assignment

## 7 Quality Assurance

### 7.1 Product Assurance

The Contractor **shall** prepare, submit, and implement any NDE 2.0 related updates to the ESPDS Quality Assurance Implementation Plan [QA 1].

### 7.2 Anomaly Reporting and Resolution

The Contractor **shall** capture, track, report status, and document resolution of NDE 2.0 related anomalies, non-conformances, and test failures.

The Contractor **shall** identify any NDE 2.0 anomalies and incidents as such within the anomaly reporting tool.

The Contractor **shall** resolve anomalies, non-conformances, and test failures identified and assigned to the contractor, based on Government-designated priority, through Government acceptance of NDE 2.0 capabilities and Acceptance Reviews.

The Contractor **shall** resolve Severity 1 (critical) and 2 (urgent) anomalies assigned to the Contractor prior to all NDE 2.0 readiness and acceptance reviews.

The Contractor **shall** complete all failure analyses on a unit or module that is critical to the performance of NDE 2.0, including failure mode, root cause analysis, and recommended corrective actions, within 30 days of failure detection.

## 8 Security Compliance

System security is of utmost concern to NOAA. In addition to the IT requirements stated in the applicable documents (AD-1 through AD-12 in Table 1), the Contractor **shall** apply and ensure that all implemented systems and contractor efforts are in total compliance with Federal, DOC, NOAA, NESDIS and OSPO security requirements, including but not limited to, Information Technology (IT) communication security requirements, for all functions both automated and manual. For reference use and applicable policies and procedures check the NESDIS IT Security Handbook web page at:

[https://intranet.nesdis.noaa.gov/ocio/it\\_security/handbook/it\\_security\\_handbook.php](https://intranet.nesdis.noaa.gov/ocio/it_security/handbook/it_security_handbook.php).

This web site is a one-stop location for access to all NESDIS, DOC, NOAA, and NIST policies, procedures, and requirements and will be available to the Contractor upon request after contract award.

*Security functional requirements/specifications.* The Contractor **shall** build specific security controls—as specified by the Government and based on the recommendations of the most recent revision of NIST SP 800-53, Recommended Security Controls for Federal Information Systems and Organizations—into the system/component at the level required by the system’s FIPS 199 security categorization, which is determined by the Government to be High.

- Applicable security controls are documented in the NDE 2.0 SRD.

The Contractor **shall** update the ESPDS Enterprise Development Subsystem Security Plan [IS 1] to include security impacts of NDE 2.0.

The Contractor **shall** assist the Government in identifying required updates to the ESPC System Security Plan.

The Contractor **shall** generate a Security Scan Report [IS 5] to report vulnerabilities and mitigations prior to delivering a system to a Government site.

The Contractor **shall** generate a Security Authorization Input Package [IS 4] to assist the ESPC ISSO in finalizing IATT and ATO documentation.

The Contractor **shall** update the Enterprise E-Authentication Package [IS 2] and Privacy Threshold Analysis/Privacy Impact Assessment [IS 3] as necessary to address security impacts of NDE 2.0.

*Developmental and evaluation-related assurance requirements.* The Contractor **shall** follow security engineering principles (including secure coding practices and code review for software development) consistent with NIST SP 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), to follow a configuration management process in accordance with NIST SP 800-128, Guide for Security-Focused Configuration Management of Information Systems, and to perform security testing and evaluation before delivery to the government.

The Contractor **shall** implement a verifiable flaw remediation process to correct weaknesses and deficiencies identified during the security testing and evaluation process.

*Use of Tested, Evaluated, and Validated Products:* The Contractor **shall**, to the extent technically possible, incorporate products that have been tested, evaluated, and validated by the government. NIST SP 800-23, Guidelines to Federal Organizations on Security Assurance and Acquisition/Use of Tested/Evaluated Products, provides guidance on the acquisition and use of tested/evaluated information technology products. NIST SP 800-36, Guide to Selecting Information Technology Security Products, provides guidance on the selection of information security products.

The Contractor **shall** comply with the IT Security requirements of the Department of Commerce as outlined in Commerce Acquisition Regulation (CAR) 1352.239-72, Security Requirements For Information Technology Resources (April 2010), with the exception that the development of

a Security Accreditation Package in accordance with CAR 1352.239-72, section (i), is not required.

In addition the Contractor **shall** screen personnel in accordance with the requirements for High Risk contracts as specified by CAM 1337.70 section 2.2; specifically, in accordance with CAR 1352.237-70, Security Processing Requirements—High or Moderate Risk Contracts (April 2010). Any access by contract personnel who are Foreign Nationals shall be in accordance with the requirements of CAR 1352.237-73, Foreign National Visitor and Guest Access to Departmental Resources (APR 2010).

The Contractor **shall** utilize hardware that is capable of being configured to utilize PIV-compliant smart card authentication in accordance with HSPD-12. Specifically, in order to comply with FIPS PUB 201, agencies are required to purchase only approved personal identity verification products and services. (b) Agencies may acquire the approved products and services from the GSA, Federal Supply Schedule 70, Special Item Number (SIN) 132-62, HSPD-12 Product and Service Components, in accordance with ordering procedures outlined in FAR Subpart 8.4.

The Contractor **shall** utilize hardware that is Internet Protocol Version 6 (IPv6) capable. Specifically, IPv6 requirements from FAR part 11.002 (g) are hereby incorporated, specifically: This requirements specification document requires compliance with the technical capabilities defined in the USGv6 Profile (NIST Special Publication 800-119) and the corresponding declarations of conformance defined in the USGv6 Test Program (see also OMB Memorandum M-05-22 dated August 2, 2005).



## APPENDIX A: Applicable and Reference Documents

Applicable documents are Government-prepared and controlled documents and industry standards documents.

### A.1 Applicable Documents

DOCUMENT ID	TITLE	AVAILABLE LOCATION	REVISION	DATE
TBS	NDE 2.0 Requirements Document	ESPDS PMO	Latest	Latest
212-1300	NOAA IT Security Manual	<a href="https://www.csp.noaa.gov/policies/index.html">https://www.csp.noaa.gov/policies/index.html</a>	4.2	March 31, 2008
474-00303	Joint Polar Satellite System (JPSS) Ground System (GS) to National Environmental Satellite, Data, and Information Service (NESDIS) Environmental Satellite Processing Center (ESPC) Interface Requirements Document (IRD)	ESPDS PMO	TBD	TBD
NPR 7123.1A	NASA Systems Engineering Processes and Requirements	<a href="http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&amp;c=7123&amp;s=1A">http://nodis3.gsfc.nasa.gov/displayDir.cfm?t=NPR&amp;c=7123&amp;s=1A</a>	1A	March 26, 2007
AD-1	NIST 800-37, Rev. 1, Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach	<a href="http://csrc.nist.gov/publications/nistpubs/800-18-Rev1/sp800-18-Rev1-final.pdf">http://csrc.nist.gov/publications/nistpubs/800-18-Rev1/sp800-18-Rev1-final.pdf</a>	Final	02/2010
AD-2	NIST 800-60, Rev. 1, Guide for Mapping Types of Information and Information Systems to Security Categories.	<a href="http://csrc.nist.gov/publications/nistpubs/index.html">http://csrc.nist.gov/publications/nistpubs/index.html</a>	Final	08/2008
AD-3	U.S. Department of Commerce, IT Security Program Policy and Commerce Interim Technical Requirements	<a href="http://www.osec.doc.gov/cio/ITSIT/DOC-IT-Security-Program-Policy.htm">http://www.osec.doc.gov/cio/ITSIT/DOC-IT-Security-Program-Policy.htm</a>	Final	01/ 2009
AD-4	NOAA NESDIS Office of Satellite Operations, IT Management User Guide	G:\OSO\C&A Activities\OSO Policies and Procedures	Final	03/11/2008
AD-5	NOAA IT Security Web page	<a href="https://www.csp.noaa.gov/policies/index.html">https://www.csp.noaa.gov/policies/index.html</a>	Updated	12/18/2008
AD-6	NIST FIPS 199, Standards for Security Categorization of	<a href="http://csrc.nist.gov/publications/fips/fips199/FIPS-PUB-199-">http://csrc.nist.gov/publications/fips/fips199/FIPS-PUB-199-</a>	Final	02/2004

DOCUMENT ID	TITLE	AVAILABLE LOCATION	REVISION	DATE
	Federal Information and Information Systems	final.pdf		
AD-7	NIST SP 800-53 Rev 3, Recommended Security Controls for Federal Information Systems and Organizations	<a href="http://csrc.nist.gov/publications/nistpubs/index.html">http://csrc.nist.gov/publications/nistpubs/index.html</a>	Final	05/2010
AD-8	NIST SP 800-34 Rev. 1, Contingency Planning Guide for Information Technology Systems	<a href="http://csrc.nist.gov/publications/nistpubs/index.html">http://csrc.nist.gov/publications/nistpubs/index.html</a>	Final	11/2010
AD-9	OMB Circular A-130, Appendix III, Security of Federal Automated Information Resources	<a href="http://www.whitehouse.gov/omb/circulars_a130_a130appendix_iii">http://www.whitehouse.gov/omb/circulars_a130_a130appendix_iii</a>	Revised	11/2000
AD-10	Federal Information Security Management Act (FISMA)	<a href="http://csrc.nist.gov/drivers/documents/FISMA-final.pdf">http://csrc.nist.gov/drivers/documents/FISMA-final.pdf</a>	Final	2002
AD-11	ANSI-748 Intent Guide	<a href="http://www.ndia.org/divisions/divisions/procurement/documents/pmscommittee/committee/documents/complementsansi/ndia_pmsc_intent_guide_may_2011.pdf">http://www.ndia.org/divisions/divisions/procurement/documents/pmscommittee/committee/documents/complementsansi/ndia_pmsc_intent_guide_may_2011.pdf</a>	Final	05/2011
AD-12	NESDIS IT Security Policies and Procedures	<a href="https://intranet.nesdis.noaa.gov/ocio/it_security/handbook/it_security_handbook.php">https://intranet.nesdis.noaa.gov/ocio/it_security/handbook/it_security_handbook.php</a>	Updated	05/01/2011

## A.2 Reference Documents

Reference documents amplify or clarify information presented in the document.

DOCUMENT ID	TITLE	REVISION	DATE	SOURCE LOCATION
OSD-ESPDS-WA-R3-011	Work Assignment Two: NPOESS Data Exploitation (NDE) Development and Transition to Operations	1.3	8/2010	ESPDS PMO
OSD-ESPDS-GCOMTASK-R2-001	Environmental Satellite Processing and Distribution System (ESPDS) Development GCOM Processing and Distribution System Task Statement	1.2	1/30/21013	ESPDS PMO

**APPENDIX B: CDRL Table**

<b>ID</b>	<b>Title</b>	<b>Applicability Level</b>	<b>Task Order Submission</b>
PM 1	Project Management Plan (PMP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 2	Integrated Master Plan (IMP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 5	Meeting Minutes	Work Assignment	Final: Meeting + 1 week Updates: As required
PM 6	Task Order and Work Assignment Closure Plans	ESPDS Enterprise and Work Assignments	Initial: Task Order or WA Completion - 90 days Final: Task Order or WA Completion - 30 days
PM 7	Integrated Master Schedule	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 8	Status Reports	ESPDS Enterprise and Work Assignments	As required in accordance with the ESPDS CDRL
PM 9	Project Management Status Review (PMSR) Data Package	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 10	Integrated Baseline Review (IBR) Data Package	ESPDS Enterprise	Final: IBR – 1 week Updates: As required for baseline changes and updates
PM 11	Earned Value Management System (EVMS) Plan	ESPDS Enterprise	Final: IBR – 1 week Updates: Annually by August 1st
PM 12	Contract Performance Report (CPR)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 13	Personal Property Management Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 14	Personal Property Inventory	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
PM 15	Work Breakdown Structure (WBS)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
FM 1	Contract Funds Status Report	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 1	Document Tree	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 3	Specification Tree	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 4	Change Requests (CR)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 5	Configuration Item Identification List	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 6	Configuration Item Control Board Documentation	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 7	Engineering Deviations and Waivers	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 8	Configuration Management Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
CC 9	Anomaly Tracking List	ESPDS Enterprise	As required in accordance with the ESPDS CDRL

IS 1	System Security Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
IS 2	E-Authentication Package	ESPDS Enterprise	Initial: PDR – 1 week Final: WA Completion – 1 week Updates: As required by the DID
IS 3	Privacy Threshold Analysis/ Privacy Impact Assessment	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
IS 4	Security Authorization Inputs	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SE 1	Systems Engineering Management Plan (SEMP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SE 2	‘To Be’ Architecture	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SE 3	Operations Concept	ESPDS Enterprise	Initial: PDR – 1 week Final: CDR – 1 week Updates: Initial CDR – 3 weeks, every WA SDR, PDR, CDR and as required
SE 4	Requirements Specifications	Work Assignment	Initial: WA SDR – 1 week Final: WA PDR – 1 week Updates: As required
SE 5	Interface Requirements Specification (IRS)	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: WA CDR + 90 days and as required
SE 6	Interface Control Document (ICD)	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR - 1 week Updates: WA CDR + 90 days and as required
SE 8	Verification & Validation Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SE 9	Performance Verification Reports	Work Assignment	As required in accordance with the ESPDS CDRL
SE 10	Performance Verification Matrix	Work Assignment	Initial: WA PDR – 1 week Final: WA Operational Readiness Review – 1 week Updates: Each verification activity + 30 days and as required
SE 11	Modeling and Simulation Plan	ESPDS Enterprise	Initial: WA SDR – 1 week Final: WA CDR – 1 week Updates: CDR + 90 days and as required
SE 12	Modeling and Simulation Analysis Report	Work Assignment	As required in accordance with the ESPDS CDRL
SE 13	Design Description	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: CDR + 90 days and as required
SE 14	Database Design Description	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: CDR + 90 days and as required
SE 15	Engineering Drawings and Change Notices	Work Assignment	Initial: WA CDR – 1 week Final: 1 week prior to WA PSR(s) Updates: As required

SE 16	Study and Analysis Reports	Work Assignment	As required in accordance with the ESPDS CDRL
RE 1	Test Readiness Review Package	Work Assignment	Final: 1 week prior to testing Updates: 1 week prior to each test
RE 2	Pre-Ship Review (PSR) Packages	Work Assignment	Final: 1 week prior to WA PSR
RE 4	System Requirements Review (SRR)/ System Definition Review (SDR) Packages	Work Assignment	Initial: WA SRR/SDR – 1 week Final: WA SRR/SDR + 30 days
RE 5	Preliminary Design Review (PDR) Packages	Work Assignment	Initial: WA PDR – 1 week Final: WA PDR + 30 days
RE 6	Critical Design Review (CDR) Packages	Work Assignment	Initial: WA CDR – 1 week Final: WA CDR + 30 days
RE 7	Operational Readiness Review (ORR) Packages	Work Assignment	Initial: WA ORR – 1 week Final: WA ORR + 30 days
RE 8	Systems Acceptance Review (SAR) Packages	Work Assignment	Initial: WA SAR – 1 week Final: WA SAR + 30 days
HW 1	Hardware COTS Modification Report	Work Assignment	As required in accordance with the ESPDS CDRL
HW 2	Hardware Installation Plan	Work Assignment	Final: WA PSR – 1 week Updates: As required
SW 1	Software Management and Development Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SW 2	Software COTS Modification Report	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
SW 3	Software Release Delivery Package	Work Assignment	As required in accordance with the ESPDS CDRL
SW 4	Software Version Description	Work Assignment	Initial: TRR – 1 week Final: For each WA Updates: 1 week prior to each test and as required
SW 5	Software Design Document	Work Assignment	Initial: TRR – 1 week Final: WA Completion – 1 week Updates: As required
SW 6	Software Test Plan	Work Assignment	Initial: PDR – 1 week Final: CDR – 1 week Updates: As required
SW 7	Software User Manual(s)	Work Assignment	Initial: TRR – 1 week Final: WA Completion – 1 week Updates: As required
IT 1	Integration and Test Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
IT 2	Detailed Test Plan(s) and Procedures	Work Assignment	Initial: 1 week prior to test Final: TRR/Test – 1 week Updates: As required
IT 3	Post-Test Data Analysis Report	Work Assignment	As required in accordance with the ESPDS CDRL
IT 4	Post-Test Data Packages	Work Assignment	As required in accordance with the ESPDS CDRL
TO 1	Operations and Maintenance Manual	Work Assignment	As required in accordance with the ESPDS CDRL
TO 3	Computer Operations Manuals	Work Assignment	As required in accordance with the ESPDS CDRL

TO 4	Computer Programming Manuals	Work Assignment	Initial: WA Final Factory TRR – 1 week Final: WA Completion – 1 week Updates: As required for each WA
TO 5	User Training, Education, and Outreach Material(s)	Work Assignment	Initial: WA Final TRR – 1 week Final: WA Training Execution – 1 week Updates: As required for each WA
TO 6	Training Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 7	Training Documentation	Work Assignment	Initial: WA Final TRR – 1 week Final: WA Training Execution – 1 week Updates: As required for each WA
TO 8	Maintenance Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 9	Maintenance Records	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 10	Facilities Plan	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
TO 11	Sustainment, Maintenance, and Lifecycle Cost Predictions Report	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
QA 1	Quality Assurance Implementation Plan (QAIP)	ESPDS Enterprise	As required in accordance with the ESPDS CDRL
QA 2	Reliability, Maintainability, and Availability (RMA) Predictions Report	Work Assignment	Initial: WA PDR – 1 week Final: WA CDR – 1 week Updates: As required

## APPENDIX C: Acronyms

AD	Applicable Document
CBU	Consolidated Back Up
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CLASS	Comprehensive Large Array-data Stewardship System
ESPC	Environmental Satellite Processing Center
ESPDS	Electronic Satellite Processing Distribution System
FIPS	Federal Processing Information Standards
GCOM-W	Global Change Observation Mission - Water
HDF5	Hierarchical Data Format 5
ICD	Interface Control Document
IDPS	Interface Data Processing System
IRS	Interface Requirements Specification
JAXA	Japan Aerospace Exploration Agency
LAN	Local Area Network
NDE	NPP Data Exploitation
NESDIS	National Environmental Satellite, Data, and Information Service
NIST	National Institute of Science and Technology
NOAA	National Oceanic and Atmospheric Administration
NSOF	NOAA Satellite Operations Facility
NUPs	NOAA Unique Products
OSDPD	Office of Satellite Data Processing and Distribution
ORR	Operational Readiness Review
OSO	Office of Satellite Operations
OSPO	Office of Satellite & Product Operations
PDA	Product Distribution and Access
SNPP	Suomi National Polar-orbiting Partnership
SOW	Statement of Work
SRR	System Requirements Review
TBC	To Be Confirmed
TBS	To Be Supplied

TRR	Test Readiness Review
VIIRS	Visible Infrared Imaging Radiometer Suite
WA	Work Assignment



<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 028		3.EFFECTIVE DATE 08/27/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 07/30/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> FAR 43.103(a)(3) Supplemental Agreement				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:08/27/2013		Quote Dated:08/27/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification results from a Supplemental Agreement following negotiated changes to the requirements of the Contract. The Contractor agrees to perform, in accordance with its technical and cost proposals, the requirements detailed in Work Assignment 12 (NDE 2.0) and related documents in consideration of reimbursement of its allowable costs and a reasonable fee as set forth in the Contractor's cost proposals for Work Assignment 12, and the terms and conditions of the Contract as they relate to reimbursement of allowable cost and the earning and payment of fee. This Modification funds fully the estimated cost for Work Assignment 12, NDE 2.0 as set forth on the attached Continuation Page. <b>FOR INQUIRIES REGARDING PAYMENT CONTACT:</b> GSA Finance Customer Support 816-926-7287				
PRIOR AMOUNT		NEW AMOUNT		INCREASE/DECREASE

<b>Cost To GSA:</b>		b(4)	
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR b(6)  (Signature of person authorized to sign)	15C. DATE SIGNED 08/27/2013	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 08/28/2013
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P S 029		3.EFFECTIVE DATE 09/13/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)			9A. AMENDMENT OF SOLICITATION NO.	
			9B. DATED (SEE ITEM 11)	
			10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change	
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 08/28/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. <b>FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER.</b> If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input checked="" type="checkbox"/> <b>THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:</b>				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 52.232-22 Limitation of Funds</b>				
<b>E. IMPORTANT:</b> Contractor IS NOT required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:09/12/2013		Proposal Dated:09/12/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification allots funds to Task Item 2000 of the Task Order. See the attached continuation page for the funds allotted. <b>FOR INQUIRIES REGARDING PAYMENT CONTACT:</b> GSA Finance Customer Support 816-926-7287				

PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 09/13/2013
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / A O 030		3.EFFECTIVE DATE 10/11/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: B. Administrative Change (No Funding or POP Date Changes)		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 09/13/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> 52.232-22 Limitation of Funds and FAR 43.103(a)				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:10/11/2013		Proposal Dated:10/11/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This modification reallocates funds on Work Assignment 6 (WA6 - HRIT/EMWIN) as set forth on the attached continuation page. FOR INQUIRIES REGARDING PAYMENT CONTACT:				

GSA Finance Customer Support 816-926-7287			
PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR b(6) (Signature of person authorized to sign)	15C. DATE SIGNED 10/11/2013	16B. UNITED STATES OF AMERICA Anthony W Pellegrino (Signature of person authorized to sign)	16C. DATE SIGNED 10/11/2013
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 031		3.EFFECTIVE DATE 10/31/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: B. Administrative Change (No Funding or POP Date Changes)		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 10/11/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 43.103(a)(3) - Agreement of the Parties</b>				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:10/31/2013		Proposal Dated:10/31/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification corrects an error in the continuation page for Modification 29. Modification 29 allotted \$1296.00 more than what was captured on the continuation page. The correct continuation page for Modification 29 is attached.				

FOR INQUIRIES REGARDING PAYMENT CONTACT: GSA Finance Customer Support 816-926-7287			
PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
Cost To GSA:	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750	
15B. CONTRACTOR/OFFEROR b(6)  (Signature of person authorized to sign)	15C. DATE SIGNED 10/31/2013	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 10/31/2013
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	



<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2. AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 032		3. EFFECTIVE DATE 10/31/2013	4. REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 10/31/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 52.232-22 Limitation of Funds</b>				
<b>E. IMPORTANT:</b> Contractor IS NOT required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED: 10/31/2013		Proposal Dated: 10/31/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification allots funds to Item No. 2000 (Option Period 2) of the Contract as set forth above. The attached continuation page sets forth the allotment among the work assignments of the Contract. FOR INQUIRIES REGARDING PAYMENT CONTACT:				

GSA Finance Customer Support 816-926-7287			
PRIOR AMOUNT		NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>	b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
15A. NAME AND TITLE OF SIGNER(Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino b(6)	
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA Anthony W Pellegrino  (Signature of person authorized to sign)	16C. DATE SIGNED 10/31/2013
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 033		3.EFFECTIVE DATE 11/22/2013	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: B. Administrative Change (No Funding or POP Date Changes)		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 10/31/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 43.103(a)(3) Agreement of the Parties and FAR 52.232-22 Limitation of Funds</b>				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:11/21/2013		Proposal Dated:11/21/2013		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2014		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification 33 is a Supplemental Agreement resulting from changes ordered to the Hardware Installation Plan (CDRL HW2). In consideration of performing the changed requirement, the estimated cost of Enterprise (ENT) Labor is increased by \$125,000.00 with a concomitant increase in indirect costs, base fee, and estimated award fee. The value and funds necessary to reimburse the Contractor for the changes resulting from this Supplemental Agreement are reallocated from Training and its associated indirect burden all of which is set forth on the attached Modification 33 continuation page. Accordingly, there is no change in the overall value of, or the amount obligated (allotted) to, the contract (see, FAR 52.232-22 Limitation of Funds). This Supplemental Agreement makes complete equitable adjustment for the changes ordered to the Hardware Installation Plan (CDRL HW2) prior to the date of Modification 33.				

FOR INQUIRIES REGARDING PAYMENT CONTACT: GSA Finance Customer Support 816-926-7287				
		PRIOR AMOUNT	NEW AMOUNT	INCREASE/DECREASE
<b>Cost To GSA:</b>		b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750		
15B. CONTRACTOR/OFFEROR b(6)	15C. DATE SIGNED 11/22/2013	16B. UNITED STATES OF AMERICA Anthony W Pellegrino	16C. DATE SIGNED 11/22/2013	
(Signature of person authorized to sign)		(Signature of person authorized to sign)		
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		

**Summary of Changes for Option Period 3, 2/1/2014 – 1/31/2016**

1. GOES-R Replan

NASA's GOES-R Program office, a major ESPDS Development stakeholder, conducted a re-plan effort in 2013 that delayed several significant milestones external to ESPDS but has a direct impact on several segments of the ESPDS Development program. Most significantly, the GOES-R program Operational Readiness Review (ORR) has been moved from 4/2015 to 9/2015 for all GOES-R elements, including PDA. Leading up to these dates, the ESPDS Development Integration and Test schedule must shift to the right approximately 10 months in order to align with GOES-R and accommodate PDA external testing dates. The extension in Integration and Test activities requires more management support from Solers (affects Enterprise), and PDA and HRIT/EMWIN also need to extend their support of these efforts beyond what was originally planned in 2010. GOES-R has agreed to fund the ESPDS Development work as a result of this change.

2. Approved Change Requests (CRs)

The ESPDS Development program uses a Configuration Management (CM) process to ensure a uniform approach to requested changes to program documentation and requirements. The Change Control Board (CCB) has approved several Change Requests (CRs) with impacts to the CDRL/DID document (J.01) and/or requests that will have impact to program technical requirements OP3 overall value. The attachments embedded below summarize approved change requests that have a cost impact as well as the changes that impact the CDRL document.

b(4)

3. Contract Documentation Administrative Changes

Changes to the CDRL/DID document (J.01) and Acronym List (J.09) have been approved by the project's Change Control Board (CCB). Changes are accounted for in item above (Approved Change Requests (CRs)) as some CDRL changes did have cost impacts. Embedded below is a revised version as well as one with "Track Changes" is included. Updates to the acronym list are purely for reference; there are no cost impacts.

b(4)

Anticipated effect:      N/A:      \$0

4. GCOM (GPDS) Re-plan

A critical part of the GCOM development effort during OP2 was incorporating the L2 Algorithms from STAR into the software. STAR slipped their delivery of this software several times and it has had a negative effect on the development schedule. Due to the four month delay in the L2 algorithm delivery, the GCOM implementation schedule has to be extended well into the next option period. An estimate of the additional value required to provide the staff needed to complete the implementation, testing, training, documentation and transfer to OSPO by June 2014 is (b)(4). This is in addition to the (b)(4) originally bid to provide O&M support for an entire year in the next option period. Note: while waiting for these algorithms, Solers conserved labor and procurements and is therefore expected to underrun for this WA in OP2.

5. NDE 1.0 Extension thru 6/27/2014

NDE 1.0 (Work Assignment 2) was planned to be completed by the end of OP2. Given that the System Acceptance Review (SAR) has been delayed again, scheduled to occur now in May 2014, the Government requires Solers' support thru June 2014. The change establishes value for WA2 in OP3 which would have been \$0. The attachments embedded below (based on contract modification 26, when additional Post Installation Engineering Support ("PIES") was added to the Solers contract) contain a summary of the changes requested for this Work Assignment as well as a Government Cost Estimate for these changes.

(b)(4)

**Summary of Changes for Option Period 2, 2/1/2012 – 1/31/2014**

1. Reduce PDA ODCs Value

The PDA Operational Environment Bill of Materials ("PDA BOM") will not be procured under the Solers contract as previously planned. As a result, there will be approximately (b)(4) of hardware and software that will be procured utilizing another GSA procurement vehicle or mechanism. This approach reduces the overall fees paid on the procurement of HW/SW and avoids using the Solers contract as a procurement mechanism for the Government. Additionally, this approach avoids utilizing remaining contract Value on HW/SW when it could be better utilized for development labor. Reducing the OP2 overall Value by (b)(4) conserves the overall Order Value as these procurements can be conducted elsewhere.

Anticipated effect: Decrease PDA ODCs Value by:

(b)(4)

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 034		3.EFFECTIVE DATE 01/31/2014	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 11/22/2013 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:  (a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 52.217-9 Option to Extend the Term of the Contract</b>				
<b>E. IMPORTANT:</b> Contractor IS NOT required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:01/31/2014		Proposal Dated:01/31/2014		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2016		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This Modification: (1) Exercises the Option to Extend the Term of the Contract in accordance with FAR Clause 52.217-9 (MAR 2000) as detailed in Option Period 3 (February 1, 2014 to January 31, 2016) of Section F. 3 of the Task Order as modified by this Modification;  (2) Is a Supplemental Agreement modifying the value of certain Work Assignments as detailed in the ES PDS Development Summary of Anticipated Contract Changes, dated January 22, 2014 and the Contractor's Request for Equitable Adjustment as detailed in its document titled "Proposal in Response to Changes Required in Option Period Three (3) for Multiple Work Assignments on Environmental Satellite Processing and Distribution				

System Development Services (ESPDs)" dated January 30, 2014 and attendant revised estimated cost and fee proposal. This Modification makes complete equitable adjustment for the "ESPDs Development Summary of Anticipated Contract Changes" dated January 22, 2014 by modifying the task order values as requested by the Contractor in its January 30, 2014 Request for Equitable Adjustment; and,

(3) Allots funds to Option Period 3 of the Task Order as set forth on the attached continuation page. Funds are presently available for Work Assignment 2 NDE 1.0 and Work Assignment 12 NDE 2.0; however, as of the date of this Modification the funds are not available within the GSA electronic contracting system for allotment to the Task Order. A subsequent modification to this Task Order, allotting funds to Work Assignment 2 NDE 1.0 and Work Assignment 12 NDE 2.0, will issue during the week of February 2, 2014. This Task Order is an incrementally funded Cost Plus Award Fee type contract. Funds are allotted in accordance with FAR Subpart 17.2, specifically FAR 32.703-1 and FAR Clause 52.232-22.

**FOR INQUIRIES REGARDING PAYMENT CONTACT:**

GSA Finance Customer Support 816-926-7287

PRIOR AMOUNT		NEW AMOUNT		INCREASE/DECREASE
<b>Cost To GSA:</b>		b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER(Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750		
15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA Anthony W Pellegrino (Signature of person authorized to sign)	16C. DATE SIGNED 01/31/2014	
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		



<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 035		3.EFFECTIVE DATE 02/06/2014	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 01/31/2014 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>FAR 43.103(a)(3) Supplemental Agreement and FAR 52.232-22 Limitation of Funds</b>				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:02/04/2014		Proposal Dated:02/04/2014		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2016		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>

b(4)

## This Modification:

(1) Restates the Supplemental Agreement described and provided for in Modification 34. Specifically, Modification 34 exercised the Option to Extend the Term of the Contract (FAR 52.217-9) by purchasing Option Period 3 of the Contract and made equitable adjustment for certain changes to the Contract as set forth and described in Modification 34. Modification 34 issued unilaterally in accordance with FAR 52.217-9 Option to Extend the Term of the Contract; however, time constraints associated with timely exercise of said option did not afford the Contractor an opportunity to sign the modification evincing its agreement to the Supplemental Agreement resulting from its request for an equitable adjustment resulting from changes to Option Period 3 (all of which is described in Modification 34); and

(2) Allots funds to Option Period 3 of the Task Order as set forth on the attached continuation page. This Task Order is an incrementally funded Cost Plus Award Fee type contract. Funds are allotted in accordance with FAR Subpart 17.2, specifically FAR 32.703-1 and FAR Clause 52.232-22.

**FOR INQUIRIES REGARDING PAYMENT CONTACT:**

GSA Finance Customer Support 816-926-7287

PRIOR AMOUNT		NEW AMOUNT		INCREASE/DECREASE
<b>Cost To GSA:</b>		b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750		
15B. CONTRACTOR/OFFEROR b(6)	15C. DATE SIGNED 02/07/2014	16B. UNITED STATES OF AMERICA Anthony W Pellegrino	16C. DATE SIGNED 02/10/2014	
(Signature of person authorized to sign)		(Signature of person authorized to sign)		
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		



# **Environmental Satellite Processing and Distribution System (ESPDS) Development**

## **Polar-Orbiting Environmental Satellite Ground System Backup System Requirements Document (SRD)**

**Version 1.0**

**June 2013**



U.S. Department of Commerce (DOC)  
National Oceanic and Atmospheric Administration (NOAA)  
National Environmental Satellite, Data, and Information Service (NESDIS)

## CHANGE RECORD

<b>DOCUMENT TITLE: ESPDS Polar-Orbiting Environmental Satellite (POES) Ground System Backup System Requirements Document (SRD).</b>			
<b>VERSION</b>	<b>DATE</b>	<b>PAGES AFFECTED</b>	<b>DESCRIPTION</b>
0.1	09/05/12	All	Initial Draft
0.2	11/07/12	All	Second Draft
0.3	12/3/2012	All	Third Draft (entered in DOORS; formatting)
0.4	3/4/2013	All	Fourth Draft (additional edits by ESPDS Dev PMO)
1.0	6/26/2013	All	Baselined per CR 354

The document version number identifies whether the document is a draft, final, revision, or update, defined as follows:

- **Draft:** A document not yet baselined. This document may be distributed for team reviews, but is still undergoing considerable changes. Use 0.1, 0.2, 0.3, etc. for unpublished documents. Use 0.1A, 0.1B, when distributing sequential updates within a short period (less than two (2) weeks).
- **Final:** The first baseline version of the document. The final is always identified as Version 1.0.
- **Revision:** An edition with minor changes from the previous edition, defined as changes affecting less than one-third of the pages in the document. The version numbers for revisions 1.1 through 1.9, 2.1 through 2.9, and so forth. After nine revisions, any other changes to the document are considered an update. Sequential revisions should be numbered as 1.1A, 1.1B, etc.
- **Update:** An edition with major changes from the previous edition, defined as changes affecting more than one-third of the pages in the document. The version number for an update is always a whole number (Version 2.0, 3.0, 4.0, and so forth).

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# 1 INTRODUCTION

## 1.1 Background

The Polar-Orbiting Environmental Satellite (POES) Ground System (GS) performs four major functions: commands the satellites, monitors and maintains the state of health of the satellites and the associated payloads, receives and stores instrument weather and environmental data, and transfers the weather data to the Environmental Satellite Processing Center (ESPC) and European Organization for the Exploitation of Meteorological Satellites (EUMETSAT). The POES System is a distributed system with primary components located at three sites: the NOAA Satellite Operations Facility (NSOF) in Suitland, Maryland; the Wallops Command and Data Acquisition Station (WCDAS) in Wallops, Virginia; and the Fairbanks Command and Data Acquisition Station (FCDAS) in Fairbanks, Alaska. A top level overview of the POES mission including mission description, spacecraft, instruments, and ground systems is available at

[http://www.osd.noaa.gov/Spacecraft%20Systems/Pollar\\_Orbiting\\_Sat/NOAA\\_N\\_Prime/NOAA\\_NP\\_Booklet.pdf](http://www.osd.noaa.gov/Spacecraft%20Systems/Pollar_Orbiting_Sat/NOAA_N_Prime/NOAA_NP_Booklet.pdf).

Many of the data, products, and services provided by the ESPC directly contribute to the issuance of life saving National Weather Service (NWS) watches and warnings to the public. These systems and their data products are used by the NWS and Department of Defense (DoD) as inputs to analyses and forecast models. As such, they fall under Homeland Security Presidential Directive (HSPD) - 7 Critical Infrastructure Protection Plans to Protect Federal Critical Infrastructure such as ESPC. Therefore, a backup and recovery capability (file-level, directory-level, user-level, and system-level information, for example, system-state information, operating system and application software, and licenses) is required for critical products and functions should a disaster render the primary ESPC inaccessible or inoperable.

The ability to create routine system backups and to restore from them is required for disaster recovery as part of the protection of Federal Government information and information systems in accordance with the Federal Information Security Management Act (FISMA) of 2002, Public Law 107-347. The existing POES Ground System (GS) design has various methods to manually create system backups in non-uniform backup formats. The Office of Satellite and Product Operations (OSPO) and ESPC requires the ability to create system backups that can be automatically scheduled or manually backed up to removable media for offsite storage.

## 1.2 Scope

This document contains the complete set of requirements that define system functional and performance capabilities, identify system interfaces, and mandate system compliance with applicable laws, regulations, and standards. This document also serves as a focal point for the traceability of all lower level or derived requirements contained in project-specific documentation. The foremost objective of the project is to provide a means to restore any computer system component in the POES ground system following a failure or loss of that component or components. The Government expects the Contractor to produce a solution to

backup all computer system components in the current POES ground system and to be flexible enough to perform the same function for the POES ground system as future spacecraft are added and modifications, upgrades or replacements are made to the ground system.

### **1.3 Document Organization**

Section 1 provides introduction and background information.

Section 2 contains documentation that provides supplemental information.

Section 3 contains the formal set of system requirements.

## **2 APPLICABLE DOCUMENTS**

The POES Backup System (PBS) Work Assignment # 10 contains the Contractor's task assignments necessary to fulfill the requirements contained in this requirements document.

### **2.1 Order of Precedence**

In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## **3 TECHNICAL SYSTEM REQUIREMENTS**

### **3.1 Disaster Recovery**

The PBS **shall** be able to write data to a removable media that can be stored at off-site locations.

The PBS **shall** be able to accomplish a 100% complete restore of a newly acquired replacement system, including the operating system, applications, and data from the previously created backup media.

The PBS **shall** be capable of producing an image backup of a disk volume and restoring the disk volume image to a replacement system disk.

The PBS **shall** be capable of backing up selected information, specific to individual components, which may be required by the operating system to completely restore an image backup to a usable state.

The PBS **shall** have the ability to schedule an automatic or perform a manual backup of any disk volume, including operating systems, and any information required to restore a POES GS component computer system or disk volume to operational readiness for disaster recovery purposes.

The PBS **shall** be able to restore the disk volume or a replacement disk volume to a bootable state from the generated backup of an operating system disk volume, or boot device.

The PBS **shall** be capable of restoring non-bootable disk volumes whether they contain operating systems or not, to a state of operational readiness from the backup.

### 3.2 Directory and File-based Backups

The PBS **shall** be able to schedule automatic backups of data on any disk volume on any computer system in the POES GS on a directory or file basis.

The PBS **shall** be capable of restoring the entire directory if backed up on a directory basis, or individual files if backed up on a file basis, to either the original location or another location within POES GS computer system and disk volume.

### 3.3 Interim Backups

The PBS **shall** have the ability to schedule automatic interim backups or perform manually initiated interim backups of either the full image disaster recovery type or directory or file-based type.

The PBS interim backups **shall** backup data changed since the last backup of the same type.

The PBS interim backups **shall** be capable of being restored on a computer system that was restored from a complete disaster recovery type or directory or file-based type to restore that computer system to the same condition as it was on the date that the interim backup was made.

### 3.4 System Non-Specific

The PBS **shall** have the ability to schedule automatic backups or perform manually initiated backups of all computer systems and disk volumes in the existing POES GS.

### 3.5 Network Based

The PBS **shall** use the Ethernet network as the transport medium between the POES GS components and the backup solution hardware.

The PBS **shall** automatically or manually backup and restore the target POES GS components via the network.

### 3.6 Backup Solution Local Disk Storage

The PBS **shall** include a disk array to cache backups as they are made.

The PBS disk array **shall** be used also as a 30-day short-term repository for backups that may be needed for restoration quickly and as a repository for backups to be moved from offline backup media for restoration via the network.

The PBS **shall** support Redundant Array of Independent Disks (RAID) levels 1 and 5 using a hardware-based RAID controller.

The PBS **shall** be configured as a Redundant Array of Independent Disks (RAID) level 5 to ensure redundancy.

### 3.7 Multiple Offline Copies

The PBS **shall** be able to make multiple copies of a backup to offline media.



### 3.8 Archival Data Backup

The PBS **shall** be capable of automatically or manually backing up data of any type on a file or directory basis for the purposes of archival storage and restoration. Examples of this type of data are spacecraft payload data, spacecraft product data, log files, applications or databases. Some of this data **shall** reside on an interim disk array that is used as a cache for the creation of removable media backup copies, and as a short term (30-days) repository for data that may have to be retrieved quickly.

### 3.9 Automation and Control

The PBS **shall** have the ability to automatically make backups of POES systems as configured by the user on a scheduled basis.

The schedule **shall** have the capability of being configurable and modifiable with a backup scheduling process.

The PBS **shall** include a Graphical User Interface (GUI) configuration tool that allows users to add, modify or delete backup tasks from a display local to the solution hardware or from a remote computer system on the POES network.

The PBS configuration tool **shall** be accessed using common web browsers interface.

The PBS configuration tool **shall** write changes to the scheduled backups to a local file on the PBS non-volatile storage so that changes are preserved across system reboots.

The PBS configuration tool **shall** be able to initiate a task based on absolute date, relative date, or a combination of both.

The PBS configuration tool **shall** be able to apply or copy tasks to be performed on multiple systems.

The PBS configuration tool **shall** allow users to check on the status of current, pending or completed tasks, to see an indication of whether a current task is performing or static (hung), and to access a log of errors encountered or successful completions of tasks.

### 3.10 Local File Maintenance

The PBS **shall** delete or move files in the local disk array based on one or more selection criteria: file name, creation modification date and version, the number of files in a directory, and file size or total file size.

This PBS **shall** execute at predetermined time intervals to perform this task.

The PBS **shall** control local file maintenance by a configuration file that may be modified by a text editor or GUI interface.

The PBS **shall** allow configuration of local file maintenance to include defining multiple different classes of files for deletion using combinations of the selection criteria, execution time interval and destination directory.

The PBS **shall** run independently and continuously as a service, or daemon, or batch, or detached process.

The PBS **shall** not require stopping or starting the process or the system for the purpose modifying its configuration file.

The PBS **shall** have the capability of logging to a file a record of which files were deleted or moved by the process and when.

The PBS **shall** have a logging function capable of opening new log files based on size or time.

### **3.11 Compatibility**

The PBS **shall** be compatible with Symantec's NetBackup the standard backup & recovery solution that OSPO is adopting.

### **3.12 Non-Interference**

The PBS **shall** meet all functional requirements without causing any downtime to the operational POES system.

### **3.13 Adaptability**

The PBS **shall** be capable of supporting additional POES GS components as they are added, and support removal of existing hardware from the backup schedule and backup files when hardware is removed.

The PBS **shall** be compatible with Operating System updates on target machines and on the host PBS machine.

### **3.14 Centralized**

The PBS solution **shall** be network-based.

The PBS functionality resident at the NOAA Satellite Operations Facility (NSOF) **shall** be operable from NSOF.

The PBS functionality resident at the Wallops Command and Data Acquisition Station (WCDAS) **shall** be operable from WCDAS and the NSOF.

The PBS functionality resident at the Fairbanks Command and Data Acquisition Station (FCDAS) **shall** be operable from FCDAS and the NSOF.

The PBS **shall** have interim 30-day storage for temporary storage of backups until they can be written to off-line media.

### **3.15 Security**

#### **3.15.1 Security Controls for Federal Information Systems**

The PBS **shall** comply with all security requirements for a Major Application rated as High Impact as outlined in NIST-SP-800-53, Recommended Security Controls for Federal Information Systems as implemented by ESPC FIPS 199/200. Listed below are the applicable NIST-SP-800-53 security controls:

- AC-3 Access Enforcement
- AC-4 Information Flow Enforcement
- AC-6 Least Privilege
- AC-16 Security Attributes
- AC-17 Remote Access
- AU-3 Content of Audit Records

AU-4 Audit storage capacity  
 AU-5 Response to Audit Processing Failures  
 AU-6(1) Audit Review, Analysis, and Reporting  
 AU-7 Audit Reduction and Report Generation  
 AU-8 Time Stamps  
 AU-9 - Protection of audit information  
 AU-10 Non-Repudiation  
 AU-11- Audit record retention  
 AU-12 Audit Generation  
 CP-6 - Alternate storage site  
 CP-9 - Information system backup  
 CP-10 - information system recovery and reconstitution  
 IA-2 Identification and Authentication (Organizational Users)  
 IA-3 Device Identification and Authentication  
 MP-2 Media Access  
 MP-3 - Media marking  
 MP-4 - Media protection  
 MP-5 Media Transport  
 MP-6 Media Sanitization  
 PE-5 Access Control for Output Devices  
 SI-12 - Information Output handling and retention  
 SC-28 - Protection of information at rest

### **3.15.2 Department of Commerce IT Security Program Policy**

The PBS **shall** comply with all security requirements for a Major Application rated as High Impact as outlined in the Department of Commerce IT Security Program Policy and Minimum Implementation Standards.

### **3.15.3 System Security**

The PBS **shall** comply with the procedures and policies as stated in the NOAA IT Security Manual 212-1300, Version 4.2, dated March 31, 2008.

### **3.15.4 Least Privilege**

The PBS **shall** be designed to enforce the principle of "least privilege" so that authenticated operators / administrators are limited to accessing only those system objects required for the normal performance of their duties.

### **3.15.5 System Protection**

The PBS **shall** include anti-malware and Host-based Intrusion Prevention System (HIPS) functions.

### **3.15.6 Security Precedence**

The PBS **shall** implement common security configurations using the following order of precedence:

- a) National Oceanic and Atmospheric Administration (NOAA)
- b) Department of Commerce (DOC)
- c) National Institute of Standards and Technology (NIST)
- d) Center for Internet Security (CIS)
- e) Defense Information Systems Agency (DISA)

### **3.16 Safety**

The PBS **shall** be compliant with OSHA 29 CFR 1910, Occupational Safety and Health Standards.

## Appendix A

Appendix A identifies candidate nodes to be backed up by the PBS. The first table includes hardware currently included within the POES security zone that is planned for backup by the PBS. The second list includes POES frame synchronizers which are on the POES frame sync LAN and are planned for backup by PBS. The third table includes IJPS hardware, the SOCC located components are planned for backup by the PBS. These tables were current at the time of their creation however specific machines may be changed by the time of PBS implementation.

**Table A1 POES Ground System Components**

Device	Machine Name	Site	Manufacturer	Model	OS	OS Version
ROUTER	RSSP01	SOCC	CISCO	C6-MSFC	CISCO IOS	12.2
WORKSTATION	WSOM01	WCDAS	DIGITAL	DS10	VMS	8.3
WORKSTATION	WSOM02	SOCC	DIGITAL	DS15A	VMS	8.3
WORKSTATION	WSOM03	SOCC	DIGITAL	PW600au	VMS	8.3
WORKSTATION	PSOM04	SOCC	DIGITAL	DS15A	VMS	8.3
SERVER	PSOMSV	SOCC	DIGITAL	DS15	VMS	8.3
WORKSTATION	PSOM05	SOCC	DIGITAL	DS15A	VMS	8.3
WORKSTATION	PSOM02	SOCC	DIGITAL	DS15A	VMS	8.3
WORKSTATION	PSOM03	SOCC	DIGITAL	DS15A	VMS	8.3
WORKSTATION	PSOM01	SOCC	DIGITAL	DS10	VMS	8.3
SERVER	WSOMSV	WCDAS	DIGITAL	DS10	VMS	8.3
ROUTER	RSSP01	SOCC	CISCO	C6-MSFC	CISCO IOS	12.2
LAPTOP	OSO-I-1620	SOCC	DELL	LAPTOP	WINDOWS XP	SP3
WORKSTATION	VMSMGR1352	SOCC	DELL	DIMENSION 8300	WINDOWS XP	SP3
SERVER	NOAA-TK1-BLUE	SOCC	DELL	POWEREDGE 1850	WIN 2003 SERVER	SP3
SERVER	CN0P03	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
WORKSTATION	CN0P01	SOCC	DELL	POWEREDGE 2650	WINDOWS XP	SP 3
NTP SERVER	SNTP01	SOCC	DATUM	TYMSERVER 2100	N/A	N/A
NTP SERVER	SNTP02	SOCC	DATUM	TYMSERVER 2100	N/A	N/A

SERVER	PWUS02	SOCC	HP	PROLIANT DL585	WIN 2003 SERVER	SP2
SERVER	PALTNS01	SOCC	DELL	POWEREDGE 2650	WIN 2008 SERVER	SP2
SERVER	SPPLS01	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	ALTIRIS-SE	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	PSDBALT01	SOCC	DELL	POWEREDGE 2850	WIN 2003 SERVER	SP2
SERVER	SPPLS02	SOCC	DELL	POWEREDGE 2650	WIN 2008 SERVER	SP2
SERVER	PTRIPWIRE	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	PWUS01	SOCC	HP	PROLIANT DL585	WIN 2003 SERVER	SP2
SERVER	POLAR-SDC-1	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	POLAR-SDC-2	SOCC	DELL	POWEREDGE 2850	WIN 2003 SERVER	SP2
SERVER	POLAR-SDC-3	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	POLARMANAGER	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	POLARMANAGER02	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	POLARMANAGER03	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
WORKSTATION	POES_UNIX3	SOCC	DELL	OPTIPLEX 760	RED HAT LINUX	4
WORKSTATION	POES_UNIX2	SOCC	DELL	OPTIPLEX-760	RED HAT LINUX	4
ROUTER	RSEP00	SOCC	CISCO	CISCO 2811	CISCO IOS	12(4)
WORKSTATION	POES_UNIX1	SOCC	DELL	OPTIPLEX-755	RED HAT LINUX	4
WORKSTATION	NORKIN_POLAR	SOCC	DELL	OPTIPLEX 760	WINDOWS XP	SP3
LAPTOP	POLAR-ISSO	SOCC	DELL	LATITUDE D620	WINDOWS XP	SP3
WORKSTATION	POESADMIN01	SOCC	DELL	OPTIPLEX 760	WINDOWS XP	SP3
WORKSTATION	MCBRIEN_POLAR	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	SLATER-POLAR	SOCC	DELL	OPTIPLEX 760-MINI	WINDOWS XP	SP3
WORKSTATION	SCARB	SOCC	DELL	OPTIPLEX 760	WINDOWS XP	SP3
LAPTOP	NOL_6	SOCC	DELL	LATITUDE D610	WINDOWS XP	SP3
WORKSTATION	NSOF1343	SOCC	GATEWAY	M1000	WINDOWS XP	SP3
WORKSTATION	POES-DENNIS	SOCC	DELL	OPTIPLEX 760	WINDOWS XP	SP3
WORKSTATION	CD0001618972	SOCC	DELL	OPTIPLEX 760	WINDOWS XP	SP3
WORKSTATION	ALTIRIS-ADAMSON	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	CNOP02	SOCC	DELL	POWEREDGE 750	WINDOWS XP	SP3
WORKSTATION	NOAA-TK-BLUE	SOCC	DELL	POWEREDGE 1750	WIN 2003 SERVER	SP3
WORKSTATION	CUBE-1313	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS63	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS81	SOCC	DELL	OPTIPLEX 760	WINDOWS XP	SP3
WORKSTATION	PWKS85	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3

WORKSTATION	NOAA1349	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS86	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	TEP_SW	SOCC	HP	ALPHASTATION DS15A	TRU64 UNIX	OSF1
WORKSTATION	TEP_ENGR	SOCC	HP	ALPHASTATION DS15A	TRU64 UNIX	OSF1
SERVER	SPOESDEV-01	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	SPOESDEV-02	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
LAPTOP	PDEVCON01	SOCC	DELL	PRECISION M6300	WINDOWS XP	SP3
LAPTOP	PDEVCON02	SOCC	DELL	PRECISION M6300	WINDOWS XP	SP3
TCS	POESDEV TCS03	SOCC	HP	INTEGRITY	VMS	8.3
COMM CONTROLLER	PCOM01	SOCC	HP	INTEGRITY	VMS	8.3
COMM CONTROLLER	PCOM02	SOCC	HP	INTEGRITY	VMS	8.3
WORKSTATION	PWKS02	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS03	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS04	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS05	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS06	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS07	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS08	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS09	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS10	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS11	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS12	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS13	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS14	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS15	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS16	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS17	SOCC	DELL	OPTIPLEX 755	WINDOWS XP	SP3
WORKSTATION	PWKS18	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS19	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS62	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3

WORKSTATION	PWKS64	SOCC	DELL	OPTIPLEX 760	WINDOWS XP	SP3
WORKSTATION	PWKS65	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS70	SOCC	DELL	PRECISION-360	WINDOWS XP	SP3
WORKSTATION	PWKS73	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS74	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS96	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS97	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS98	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	PWKS99	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
SERVER	SPOESOPS-01	SOCC	DELL	PE 2650	WIN 2003 SERVER	SP2
SERVER	SPOESOPS-02	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	SPAS_NAS_02	SOCC	DELL	POWEREDGE 1850	WIN 2003 SERVER	SP2
SERVER	SPAS_NAS_01	SOCC	DELL	POWEREDGE 1850	WIN 2003 SERVER	SP2
WORKSTATION	SOMSPC	SOCC	DELL	PRECISION 360	WINDOWS XP	SP3
SERVER	SPOESOPS-BATCH	SOCC	DELL	POWEREDGE 1650	WIN 2003 SERVER	SP2
WORKSTATION	LISBETH	SOCC	COMPAQ	ALPHASTATION DS10	TRU64 UNIX	N/A
SERVER	POESOWLBLUE	SOCC	DELL	POWEREDGE 1650	WIN 2003 SERVER	SP2
SERVER	TTSSHB	SOCC	ISI	N/A	TRU64 UNIX	N/A
SERVER	PLCR01	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
LAPTOP	POPSCON01	SOCC	DELL	PRECISION M6300	WINDOWS XP	SP3
LAPTOP	POPSCON02	SOCC	DELL	PRECISION M6300	WINDOWS XP	SP3
WORKSTATION	ELVIS	SOCC	DELL	PRECISION T5500	WINDOWS XP	SP3
TCS	POESOPSPTCS01	SOCC	HP	INTEGRITY	VMS	8.3
TCS	POESOPSPTCS02	SOCC	HP	INTEGRITY	VMS	8.3
TCS	POESOPSPTCS03	SOCC	HP	INTEGRITY	VMS	8.3
SERVER	PCOM01	SOCC	HP	INTEGRITY RX2660	VMS	8.3
SERVER	PCOM02	SOCC	HP	INTEGRITY RX2660	VMS	8.3
ROUTER	RWSP06	WCDAS	CISCO	CISCO 2811	CISCO IOS	12(4)
ROUTER	RWSP06	WCDAS	CISCO	CISCO 2811	CISCO IOS	12(4)
SERVER	WPOESDEV01	WCDAS	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2



SERVER	WPOESDEV02	WCDAS	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
LAPTOP	WDEVCON01	WCDAS	DELL	PRECISION M6300	WINDOWS XP	SP3
COMM CONTROLLER	WCOM01	WCDAS	HP	INTEGRITY	VMS	8.3
VIRTUAL ADDRESS	RWSP01	WCDAS	CISCO	CISCO 2811	CISCO IOS	12(4)
ROUTER	RWWP01	WCDAS	CISCO	CISCO 2811	CISCO IOS	12.4(21)
WORKSTATION	WWKS01	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	WWKS02	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	WWKS03	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	WWKS04	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	WWKS05	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	WWKS06	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	WWKS07	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP2
WORKSTATION	WWKS08	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATION	WWKS09	WCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
SERVER	WPOESOPS-01	WCDAS	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
SERVER	WPOESOPS-02	WCDAS	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2
STORAGE	WPAS_NAS-01	WCDAS	HP	INTEGRITY	VMS	8.3
STORAGE	WPAS_NAS-02	WCDAS	HP	INTEGRITY	VMS	8.3
LAPTOP	WOPSCON01	WCDAS	DELL	PRECISION M6300	WINDOWS XP	SP3
LAPTOP	WOPSCON02	WCDAS	DELL	PRECISION M6300	WINDOWS XP	SP3
INTERFACE	WTCS01-MP	WCDAS	HP	INTEGRITY RX2660	VMS	8.3
INTERFACE	WTCS01B-MP	WCDAS	HP	INTEGRITY RX2660	VMS	8.3
INTERFACE	WCOM01-MP	WCDAS	HP	INTEGRITY RX2660	VMS	8.3
INTERFACE	WCOM02-MP	WCDAS	HP	INTEGRITY RX2660	VMS	8.3
TCS	POESOPSWTCS01	WCDAS	HP	INTEGRITY RX2660	VMS	8.3
COMM CONTROLLER	WCOM01	WCDAS	HP	INTEGRITY RX2660	VMS	8.3
COMM CONTROLLER	WCOM02	WCDAS	HP	INTEGRITY RX2660	VMS	8.3
SERVER	POLAR-FDC-1	FCDAS	DELL	POWEREDGE 2850	WIN 2003 SERVER	SP2
SERVER	POLAR-FDC-2	FCDAS	DELL	POWEREDGE 2850	WIN 2003 SERVER	SP2
SERVER	FPOLARMANAGER01	FCDAS	DELL	POWEREDGE	WIN 2003 SERVER	SP2
COMM CONTROLLER	FCOM01-MP	FCDAS	HP	INTEGRITY	VMS	8.3

COMM CONTROLLER	FCOM02-MP	FCDAS	HP	INTEGRITY	VMS	8.3
ROUTER	RFSP00	FCDAS	CISCO	CISCO 2811	CISCO IOS	12(4)
VIRTUAL ADDRESS	RFSP01	FCDAS	CISCO	CISCO 2950	CISCO IOS	12(4)
ROUTER	RFWP01	FCDAS	CISCO	CISCO 2950	CISCO IOS	12(4)
ROUTER	RFWP01	FCDAS	CISCO	CISCO 2950	CISCO IOS	12(4)
WORKSTATIONS	FWKS11	FCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATIONS	FWKS12	FCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATIONS	FWKS13	FCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATIONS	FWKS14	FCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATIONS	FWKS16	FCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
WORKSTATIONS	FWKS17	FCDAS	DELL	PRECISION 360	WINDOWS XP	SP3
TCS	POESOPSTCS01	FCDAS	HP	INTEGRITY	VMS	8.3
COMM CONTROLLER	FCOM01	FCDAS	HP	INTEGRITY	VMS	8.3
COMM CONTROLLER	FCOM02	FCDAS	HP	INTEGRITY	VMS	8.3
ROUTER	RGSP01	GSFC	CISCO	CISCO 2811	CISCO IOS	12.4.19
WORKSTATION	PWKS96	GSFC	DELL	OPTIPLEX 755	WIN 2000	SP4
WORKSTATION	PWKS97	GSFC	DELL	OPTIPLEX 755	WIN 2000	SP4
WORKSTATION	PWKS98	LMSSC	DELL	OPTIPLEX 755	WIN 2000	SP4
WORKSTATION	PWKS99	LMSSC	DELL	OPTIPLEX 755	WIN 2000	SP4
SERVER	SPDS1	SOCC	DELL	POWEREDGE 1750	WIN 2003 SERVER	SP2
SERVER	SPDS2	SOCC	DELL	POWEREDGE 1750	WIN 2003 SERVER	SP2
SERVER	CMSVR02	SOCC	DELL	POWEREDGE 2650	WIN 2003 SERVER	SP2

**Table A2 Polar Frame Synchronizers**

<b>Device</b>	<b>Machine Name</b>	<b>Site</b>	<b>Room</b>	<b>OS</b>
POLAR FRAME SYNC	PFS01	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC	PFS02	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC	PFS03	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC	PFS04	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC	PFS05	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC	PFS06	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC	DEVPFS01	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC	DEVPFS02	SOCC	3001/MOD13L	RH LINUX
POLAR FRAME SYNC 1	WPFS01	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC 2	WPFS02	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC 3	WPFS03	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC 4	WPFS04	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC 5	WPFS05	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC 6	WPFS06	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC 7	WPFS07	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC 8	WPFS08	WCDAS	RACK 13A5	RH LINUX
POLAR FRAME SYNC	FPFS1	FCDAS	FSOF	RH LINUX
POLAR FRAME SYNC	FPFS2	FCDAS	FSOF	RH LINUX
POLAR FRAME SYNC	FPFS3	FCDAS	FSOF	RH LINUX
POLAR FRAME SYNC	FPFS4	FCDAS	FSOF	RH LINUX
POLAR FRAME SYNC	FPFS5	FCDAS	FSOF	RH LINUX
POLAR FRAME SYNC	FPFS6	FCDAS	FSOF	RH LINUX
POLAR FRAME SYNC	FPFS7	FCDAS	FSOF	RH LINUX
POLAR FRAME SYNC	FPFS8	FCDAS	FSOF	RH LINUX

**Table A3 IJPS Components**

Hostname	Component Type	Manufacturer	Model	Physical Location	Environment
OMACE-SVVM01	S e r v e r	D e l l	P O W E R E D G E  2 9 5 0	H a r r i s  O m a h a  C o m p u t e r  R o o m	M a n a g e m e n t
OMACE-SVDEV01	S e r v e r	D e l l	P O W E R E D G E	H a r r i s  O m	D e v e l o p m e

			2 9 5 0	a h a  C o m p u t e r  R o o m	n t
OMACE- WKNOC01	W o r k s t a t i o n	D e l l	6 5 0	H a r r i s  O m a h a  R M  2 4 0	M a n a g e m e n t
OMACE- WKNOC02	W o r	D e l	T 3 4	H a r	M a n

	k s t a t i o n	I	0 0	r i s  O m a h a  R M  2 4 0	a g e m e n t
MELBCE- WKNOC01	W o r k s t a t i o n	D e l i	6 5 0	M e l b o u r n e  N O C	M a n a g e m e n t
MELBCE- WKNOC03	W o r k s t a t i o	D e l i	T 3 5 0 0	M e l b o u r n e	M a n a g e m e n

	n			N O C	t
MELBCE- WKNOC10	W o r k s t a t i o n	D e l l	T 3 5 0 0	M e l b o u r n e  N O C	M a n a g e m e n t
SUITCE- SVVM02	S e r v e r	D e l l	P O W E R E D G E  R 7 1 0	S O C C  R a c k 3 9 - A 9	M a n a g e m e n t
SUITCE- SVGBP01	S e r v e r	D e l l	P O W E R E D G	S O C C  R a c	P r o d u c t i

			E R 7 1 0 G	k 3 9 - A 1 2	o n
SUITCE-SVGBP02	S e r v e r	D e l i	P O W E R E D G E  R 7 1 0 G	S O C C  R a c k 3 9	P r o d u c t i o n
SUITCE-SVVM01	S e r v e r	D e l i	P O W E R E D G E  2 9 5 0	S O C C  R a c k 3 9 - A 1 8	M a n a g e m e n t
SUITCE-	W	D	T	S	M



WKNOC03	ork station	el	3 5 0 0	O C C  O p . C e n t e r	a n a g e m e n t
DARMCE-SVGBP01	S e r v e r	D e l	P O W E R E D G E  2 9 5 0	D a r m s t a d t  R a c k 3 9	P r o d u c t i o n
DARMCE-SVLBP01	S e r v e r	D e l	P O W E R E D G E	D a r m s t a d t	P r o d u c t i o

			2 9 5 0	R a c k 3 9	n
DARMCE-SVGBP02	S e r v e r	D e l i	P O W E R E D G E  2 9 5 0	D a r m s t a d t  R a c k 4 0	P r o d u c t i o n
DARMCE-SVLBP02	S e r v e r	D e l i	P O W E R E D G E  2 9 5 0	D a r m s t a d t  R a c k 4	P r o d u c t i o n

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AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1.CONTRACT ID CODE	PAGE 1 OF 2 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 036	3.EFFECTIVE DATE 03/12/2014	4.REQUISITION/PURCHASE REQ.NO. A21764163	5.PROJECT NO. (if applicable)	
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)			9A. AMENDMENT OF SOLICITATION NO.	
			9B. DATED (SEE ITEM 11)	
			10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: E. Amount + Admin Change	
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 02/10/2014 12:00 AM	
11.THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X . A01VR110 . F1 . 25 . C01 . H08 . . .				
13.THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> OTHER (Specify type of modification and authority) FAR 43.103(a)(3) and FAR 52.232-22 Limitation of Funds				
<b>E.IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED: 03/10/2014	Proposal Dated: 03/10/2014		Order ID: R1BK13090030	
PERFORMANCE PERIOD FROM: 08/05/2010	PERFORMANCE PERIOD TO: 01/31/2016		Desired Delivery Date:	
ITEM NO	TASK ITEM DESCRIPTION	PREVIOUS MOD AMOUNT	MOD CHANGE AMOUNT	NEW MOD AMOUNT
b(4)				
<p>This Modification 36, pursuant to Section 1.4.2 of the Statement of Work of the Task Order and FAR Subpart 43.103, modifies the requirements of the Task Order by the addition of Work Assignment 10 ı POES Backup. The Contractor shall perform the requirements of the Task Order as modified by this Modification 36 and as set forth the Contractor's Work Assignment 10 ı POES Backup Technical Response dated December 4, 2013, revised December 10, 2013, and the Contractor's Cost Proposal dated December 4, 2013, unchanged by the minor revision to the Technical Response dated December 10, 2013. This Modification is Supplemental Agreement making complete equitable adjustment for the changes to the Task Order as set forth in this Modification 36. Complete equitable adjustment is made by fully funding Work Assignment 10 ı POES Backup, a fixed-price work assignment, as set forth in the December 4, 2013 Cost Proposal, and as set forth on the attached continuation page.</p> <p>This Task Order includes incrementally funded Cost Plus Award Fee work assignments and this Modification allots funds to the Cost Plus Award Fee work assignments of Option Period 3 of the Task Order in accordance with FAR 52.232-22 and as set forth on the attached continuation page. Funds are allotted in accordance with FAR Subpart 17.2, specifically FAR 32.703-1 and FAR Clause 52.232-22.</p>				

## FOR INQUIRIES REGARDING PAYMENT CONTACT:

GSA Finance Customer Support 816-926-7287

PRIOR AMOUNT		NEW AMOUNT		INCREASE/DECREASE
<b>Cost To GSA:</b>		b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER(Type or print) b(6)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750		
15B. CONTRACTOR/OFFEROR b(6)	15C. DATE SIGNED 03/12/2014	16B. UNITED STATES OF AMERICA Anthony W Pellegrino	16C. DATE SIGNED 03/12/2014	
(Signature of person authorized to sign)		(Signature of person authorized to sign)		
NSN 7540-01-152-8070 Previous edition unusable		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243		

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 037		3.EFFECTIVE DATE 04/02/2014		4.REQUISITION/PURCHASE REQ. NO. A21764163
5. PROJECT NO. (if applicable)				
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: E. Amount + Admin Change		
CODE		FACILITY CODE		
		10B. DATED (SEE ITEM 11) 03/12/2014 12:00 AM		
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> FAR 43.103(a)				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:04/01/2014		Proposal Dated:04/01/2014		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2016		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This bilateral modification decreases the value of Option Period 2, Work Assignment 1 - PDA, by \$5,979,616.65, for planned but unexecuted purchases of materials resulting from schedule changes to Work Assignment 1 - PDA. This bilateral modification decreases (deobligates) the amount allotted to Option Period 2, Work Assignment 1 - PDA, by \$2,843,423.05. The amount allotted to Option Period 2 Work Assignment 1 - PDA and to Option Period 2 overall (Task Item 2000) resulting from this modification is sufficient and necessary to reimburse the contractor for all Option Period 2 (Task Item 2000) requirements provided for under the contract. As a result of this Modification, the liability of the Government for Option Period 2 (Task				

Item 2000) is reduced from \$43,024,563.89 by \$2,843,423.05 to \$40,181,140.84 (ref. FAR 52.232-22). See the attached continuation page for the amount allotted to the contract and among the several Work Assignments for Option Period 2 (Task Item 2000) resulting from this modification. <b>FOR INQUIRIES REGARDING PAYMENT CONTACT:</b> GSA Finance Customer Support 816-926-7287			
<b>PRIOR AMOUNT</b>		<b>NEW AMOUNT</b>	<b>INCREASE/DECREASE</b>
<b>Cost To GSA:</b>		b(4)	
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.			
<b>15A. NAME AND TITLE OF SIGNER(Type or print)</b> b(6)		<b>16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)</b> Anthony W Pellegrino (617) 565-5750	
<b>15B. CONTRACTOR/OFFEROR</b> b(6) _____ (Signature of person authorized to sign)	<b>15C. DATE SIGNED</b> 04/02/2014	<b>16B. UNITED STATES OF AMERICA</b> Anthony W Pellegrino _____ (Signature of person authorized to sign)	<b>16C. DATE SIGNED</b> 04/02/2014
NSN 7540-01-152-8070 Previous edition unusable		<b>STANDARD FORM 30 (REV. 10-83)</b> Prescribed by GSA FAR (48 CFR) 53.243	

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 038		3.EFFECTIVE DATE 04/04/2014		4.REQUISITION/PURCHASE REQ. NO. A21764163
5. PROJECT NO. (if applicable)				
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE		FACILITY CODE		10B. DATED (SEE ITEM 11) 04/02/2014 12:00 AM
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended <input type="checkbox"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> FAR 52.232-22 and 43.103(a)				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:04/04/2014		Proposal Dated:04/04/2014		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2016		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				
This modification allots funds to Item No. 3000, Option Period 3 of the Contract, and reallocates previously allotted funds as set forth on the attached continuation page. Because of the funding reallocation, this is a bilateral (FAR 43.103(a)) type modification. <b>FOR INQUIRIES REGARDING PAYMENT CONTACT:</b> GSA Finance Customer Support 816-926-7287				
PRIOR AMOUNT		NEW AMOUNT		INCREASE/DECREASE



<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 039		3.EFFECTIVE DATE 04/17/2014		4.REQUISITION/PURCHASE REQ. NO. A21764163
5. PROJECT NO. (if applicable)				
6. ISSUED BY GSA Region 1 Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222 United States (617) 565-5750		7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750		
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)		9A. AMENDMENT OF SOLICITATION NO.		
		9B. DATED (SEE ITEM 11)		
		10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: A. Amount Change		
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 04/08/2014 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 299X.A01VR110.F1.25.C01.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> FAR 43.103(a)(3) and FAR 52.232-22 Limitation of Funds				
<b>E. IMPORTANT:</b> Contractor IS required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:04/17/2014		Proposal Dated:04/17/2014		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 01/31/2016		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				

This Modification (1) de-obligates \$80,000.00 in excess funds from Option Period 2 (Task Item 2000) as set forth above and on the attached Continuation Page, and (2) decreases Option Period 2 (Task Item 2000) value by \$80,000.00 as set forth on the attached Continuation Page. Option Period 2 (Task Item 2000) is fully funded, reference FAR 52.232-22. <b>FOR INQUIRIES REGARDING PAYMENT CONTACT:</b> GSA Finance Customer Support 816-926-7287				
		<b>PRIOR AMOUNT</b>	<b>NEW AMOUNT</b>	<b>INCREASE/DECREASE</b>
<b>Cost To GSA:</b>		b(4)		
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
<b>15A. NAME AND TITLE OF SIGNER</b> (Type or print) b(6)		<b>16A. NAME AND TITLE OF CONTRACTING OFFICER</b> (Type or print) Anthony W Pellegrino (617) 565-5750		
<b>15B. CONTRACTOR/OFFEROR</b> b(6) _____ (Signature of person authorized to sign)	<b>15C. DATE SIGNED</b> 04/17/2014	<b>16B. UNITED STATES OF AMERICA</b> Anthony W Pellegrino _____ (Signature of person authorized to sign)	<b>16C. DATE SIGNED</b> 04/17/2014	
NSN 7540-01-152-8070 Previous edition unusable		<b>STANDARD FORM 30 (REV. 10-83)</b> Prescribed by GSA FAR (48 CFR) 53.243		

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>		1. CONTRACT ID CODE		PAGE 1 OF 1 PAGE(S)
2.AMENDMENT/MODIFICATION NO. R1BK13090030 / P O 066		3.EFFECTIVE DATE 04/28/2016	4.REQUISITION/PURCHASE REQ. NO. A21764163	5. PROJECT NO. (if applicable)
6. ISSUED BY Region 1 Contracting Anthony W Pellegrino 10 Causeway Street Room 1085 Boston, MA 02222-1048 United States (617) 565-5750			7. ADMINISTERED BY (If other than Item 6) Anthony W Pellegrino (617) 565-5750	
8.NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) b(6) SOLERS INC. 950 N GLEBE RD STE 1100 ARLINGTON, VA 22203-1824 United States b(6)			9A. AMENDMENT OF SOLICITATION NO.	
			9B. DATED (SEE ITEM 11)	
			10A. MODIFICATION OF CONTRACT/ORDER NO. GS-06F-0654Z / GST0110BK0047 TYPE OF MODIFICATION: H. Admin + Acctg Class. Change	
CODE	FACILITY CODE		10B. DATED (SEE ITEM 11) 03/29/2016 12:00 AM	
<b>11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS</b>				
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="radio"/> is extended <input type="radio"/> is not extended.				
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:				
(a) By completing items 8 and 15, and returning _ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12.ACCOUNTING AND APPROPRIATION DATA (If required) 285F.Q01FA000.AA20.25.AF151.H08...				
<b>13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.</b>				
<input type="checkbox"/> THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify Authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
<input type="checkbox"/> THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).				
<input type="checkbox"/> THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
<input checked="" type="checkbox"/> <b>OTHER (Specify type of modification and authority)</b> <b>Administrative Action Only</b>				
<b>E. IMPORTANT:</b> Contractor IS NOT required to sign this document and return copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract matter where feasible.)				
ORDER MOD DATED:04/28/2016		Proposal Dated:04/28/2016		Order ID: R1BK13090030
PERFORMANCE PERIOD FROM: 08/05/2010		PERFORMANCE PERIOD TO: 04/30/2016		Desired Delivery Date:
<b>ITEM NO</b>	<b>TASK ITEM DESCRIPTION</b>	<b>PREVIOUS MOD AMOUNT</b>	<b>MOD CHANGE AMOUNT</b>	<b>NEW MOD AMOUNT</b>
b(4)				

This is an administrative modification required to correct a line of accounting in GSA financial system. There is no change to the Contract resulting from this modification.

\*\*\*Attention Contractors: The invoice submission functionality within the system is changing to converge and normalize invoice submission across ASSIST. The invoice submission process detailed at the following link supersedes any instructions for interfacing with the system(s) currently in the contract. These revised instructions do not change the frequency, content, supporting documentation requirements, or any other terms and conditions for invoice submission: [Invoice Submission Instructions](#)

Upon deployment of the Central Invoice Service, the contractor shall submit invoices electronically by logging into the ASSIST portal (<https://portal.fas.gsa.gov>), navigating to the appropriate order, and creating the invoice for that order. Upon deployment of the Central Invoice Service, the contractor shall NOT submit any invoices directly to the GSA Finance Center (neither by mail nor via electronic submission).

For additional assistance contact the ASSIST Helpdesk at 877-472-4877. \*\*\*

**FOR INQUIRIES REGARDING PAYMENT CONTACT:**

GSA Finance Customer Support 816-926-7287

	PRIOR AMOUNT	NEW AMOUNT	INCREASE/DECREASE
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**Cost To GSA:**

b(4)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER(Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Anthony W Pellegrino (617) 565-5750
----------------------------------------------	------------------------------------------------------------------------------------------------------

15B. CONTRACTOR/OFFEROR  (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA Anthony W Pellegrino (Signature of person authorized to sign)	16C. DATE SIGNED 04/28/2016
-------------------------------------------------------------------------	------------------	---------------------------------------------------------------------------------------------------	--------------------------------

NSN 7540-01-152-8070  
Previous edition unusable

STANDARD FORM 30 (REV. 10-83)  
Prescribed by GSA FAR (48 CFR) 53.243